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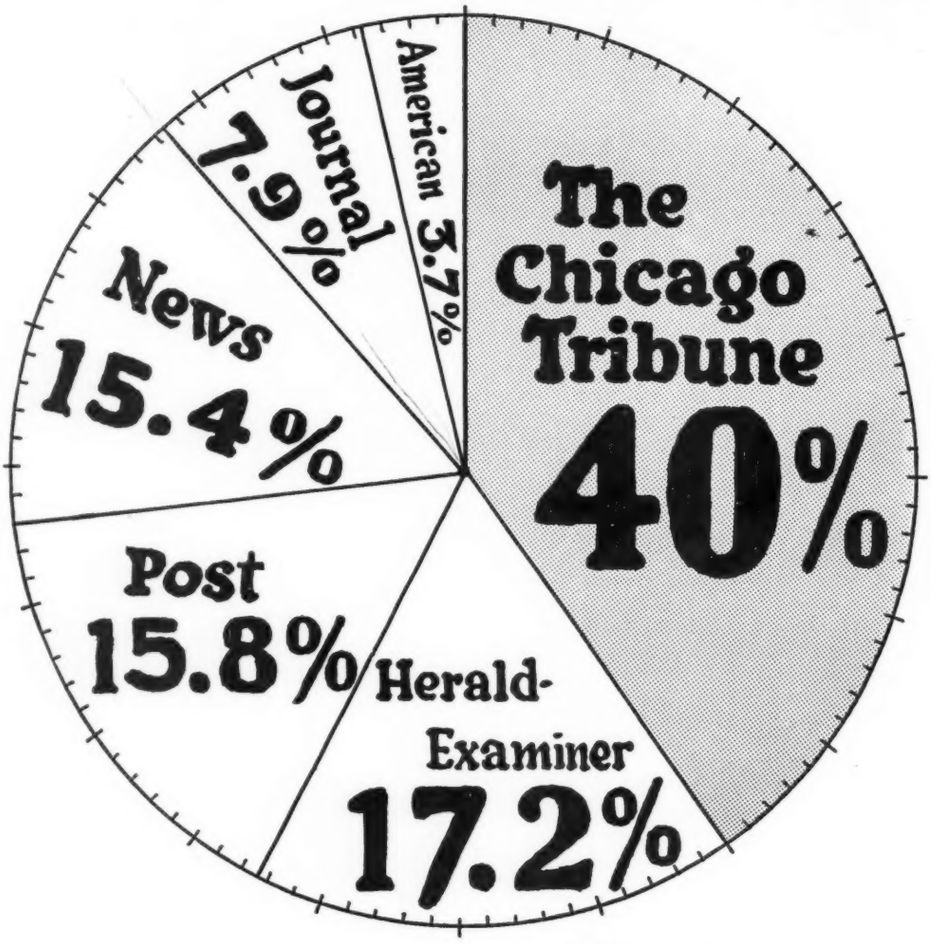

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AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

VOL. XLI NEW YORK—THURSDAY, SEPTEMBER 25, 1919—CHICAGO NO. 13

Aeronautics Soon to Become an International Problem

When the United States Signs the Peace Treaty, the Country Will Then Be Obligated to Meet Other Countries in the International Regulation of Aircraft, as Set Forth in the Convention Drafted in Paris. This Convention Was Recently Described Generally in AUTOMOTIVE INDUSTRIES, But in This Article the Sections That Concern International Relations Are Especially Set Forth

By Allen Sinsheimer

WASHINGTON, Sept. 23.

IN view of the agitation both for and against a Department of Aeronautics in this country, it is particularly important at this time to call attention to the fact that the United States will be obligated without question to the establishment of some form of Department if it becomes a signer of the Peace Treaty.

The Treaty contains a Convention on International Air Navigation with provisions obligating every contracting State to control its international aerial activities and calling for certain supervision, licensing, examination and inspection that could only be accomplished by an established department. And even though this country would witness a decline in aeronautic progress—a possibility if Congress continues its procrastination—the development of aviation in other countries and their aeronautic intercourse with us would demand the maintenance of a department just as we have had to maintain a huge bureau of navigation for sea commerce though our marine activities before the war were unimportant.

The Convention in the Peace Treaty obligates each contracting State to accord freedom of passage to the aircraft of the other nations in times of peace, to provide assistance to distressed craft, and to maintain a monthly international record of aircraft registration. It provides that aircraft will not be allowed to engage in international flights without certificates of airworthiness and competency. The commanding officers, pilots, engineers and full operating crew must be examined according to rigid specifications. To insure against harmful use of wireless and confusion of aeronautic communication wireless apparatus is prohibited on all aircraft except when specially licensed.

Log books similar to the logs kept by sea vessels must be maintained and supervised regularly by the Government whose flag the ship flies and must contain the certificates of competency, airworthiness, names of crew and passengers, bills of lading and manifests for freight, and, if equipped with wireless, the special wireless license.

Aircraft landing in foreign countries are to be examined, verified and disposed of in much the same manner as vessels arriving at foreign ports and subject to customs inspections and regulations.

To supervise the execution of these rules, collect and disseminate aeronautic data, maintain international registers, insure publication of air maps, and modify the international laws when necessary an International Commission of Air Navigation will be formed with representatives from each of the contracting States included. It will publish standardized aeronautical maps and establish a uniform system of ground marks and settle disputes relative to aviation between nations.

Definite specifications for inspection and marking of all aircraft are set forth together with standard forms for making reports, announcing weather conditions and fulfilling customs regulations. The various governments are obligated to make daily observations of the weather and issue these with analysis and summaries of past conditions and forecasts. The complete demands of the Convention outlined below give some idea of the thorough service that will be demanded by the International Commission and of the large and adequate meteorology bureaus each government will be obligated to maintain. The provisions follow:

ANNEX G.

Collection and Dissemination of Meteorological Information

1. Nature and object of meteorological information to be furnished by Contracting States:—

(A) "Statistical" is required for the purpose of indicating the degree of safety and convenience of different routes or aerodromes for different types of aircraft.

It consists of:—

(*a*) Analysis and summaries of past meteorological records.

(*b*) Summaries of current observations.

(*B*) "Current" is required for the purpose of:—

(*a*) Keeping a current record of the weather.

(*b*) Making forecasts.

It consists of:—

1. The results of daily observations.

2. Lists of active stations at which these observations are taken.

(*C*) "Forecasts" are for the purpose of telling all concerned when and where flying is possible and the best conditions for the same. They are statements of conditions anticipated:—

(*a*) "Short period" during the next three or four hours.

(*b*) "Normal" during the next 20 to 30 hours.

(*c*) "Long period" during the next two or three days.

(*d*) "Route" for particular region or route during the next six hours.

2. Methods and times of furnishing the different types of information:—

(*A*) "Statistical" is furnished by Central Meteorological Offices for general information.

(*a*) Analysis and summaries of past records—by the publication of special handbooks, giving averages, frequencies and extremes of the principal meteorological elements, together with charts and diagrams; prominence to be given to meteorological conditions of areas known to have special meteorological peculiarities.

(*b*) Summaries of current observations—by the monthly publication of the information obtained each month.

(B) "Current" is furnished by meteorological offices to meteorological offices.

(*a*) Results of daily observations—telegraphically by:—

1. Regular reports at fixed hours (*see* Appendix I) and

2. By special reports at intermediate times when requested (*see* Appendix II).

(b) Lists of stations whenever necessary, to keep other countries informed where observations are being taken, giving also local and topographical details affecting weather conditions at each station.

(*c*) "Forecasts" are furnished by Meteorological Offices for general information by publication in the public Press, telegraphically to other countries if required, or any other, the best means to bring them to the notice of those requiring them (*see* Appendix III).

APPENDIX I.—Regular Reports

These are of two kinds:—

1. Individual station reports.

2. Collective station reports.

1. Individual station reports are the results of observations of individual stations, taken at 0100, 0700, 1300, and (1800 or) 1900 G.M.T. The reports are made as soon as the observation has been taken and are rendered to a central collecting station or office: where reports for only two of these hours are possible or sufficient, the hours should be separated by an interval of twelve hours. (It is recommended that the standard hours be changed to 0300, 0900, 1500 and 2100 G.M.T. by international agreement.)

Reports will give information on the following, whenever possible:—

1. Wind.
2. Pressure.
3. Temperature and humidity.
4. Fog and visibility.
5. Clouds.
6. Precipitation.
7. Thunderstorms, hurricanes, tornadoes, dust-storms.
8. Other weather phenomena.
9. State of sea.

And also on upper air currents and upper air temperature and humidity, from stations where facilities are available for observation.

Reports will be made in the general form and in the codes given in Appendix IV.

2. Collective reports are a collection of the individual reports received by a central station or office and transmitted to other central offices. They are of three classes:—

Class 1.—The central office in this case is usually the main office of a country; it transmits its reports within 1½ hours of the time the observations are taken at the individual stations, to all main offices of other countries within a radius of 1,500 kilometres.

Class 2.—These are reports made for the purpose of giving countries over 1,500 kilometres distant information essential to making their own forecasts. The central office is that of a selected State which possesses a high-power wireless station capable of world-wide ranges (minimum range 3,000 kilometres). The report is made within three hours of the observations, and is a collection of reports selected from the Class I reports and abridged

(*see* Appendix IV). It should include a forecast of conditions in the country of origin.

Class 3.—These are local reports made by local centres to other local centres (any within 500 kilometres). The report is a collection of reports, selected from the Class I reports from stations in the vicinity and abridged (*see* Appendix IV). It is made within 30 minutes of the time of observation.

APPENDIX II.—Special Reports.

Special reports give the results of continuous observations at aerodromes having meteorological stations on recognized air routes. They are to be rendered within thirty minutes of a request from a central office on a specified aerodrome on the route. The maximum distance from which these reports will be required is 500 kilometres. The requests may take the form of a demand for hourly reports.

The reports are rendered by telephone or wireless, and may be from one country to another in the case of an international air route. The reports, when made by telegram, will be in the form and code given in Appendix IV.

APPENDIX III.—Forecasts.

Short-period forecasts covering three to four hours will give a statement of the anticipated conditions of cloud, weather, surface wind, and visibility, together with direction and speed of wind at heights of 1,000 and 2,000 metres, and an estimate of meteorological fitness for different types of aircraft.

Normal forecasts for twenty to thirty hours will give similar information but in more general terms.

Long-period forecasts give a general statement of the prospects for the next two or three days.

Route forecasts are made twice daily by central offices from information received from individual stations and will give a statement of conditions anticipated in the different regions or route of the country for about six hours ahead.

APPENDIX IV.

[This deals with the general form in which reports are to be rendered and codes for their transmission, together with the meteorological symbols and codes for every conceivable weather condition. Doubtless this technical information will eventually be embodied in a booklet which will be distributed to those concerned.]

Similarly the following customs regulations show how extensively the Department will have to operate to regulate the customs provisions. It will be noted that in addition to customs aerodromes for departure and arrival, it will be necessary to maintain huge organizations to examine cargoes, log books, manifests, declarations, fuel and so forth.

CUSTOMS.

General Provisions.

1. Any aircraft going abroad shall depart only from aerodromes specially designated by the customs administration of each contracting State, and named "customs aerodromes."

Aircraft coming from abroad shall land only in such aerodromes.

2. Every aircraft which passes from one State into another is obliged to cross the frontier between certain points fixed by the contracting States. These points are shown on the aeronautical maps.

3. All necessary information concerning customs' aerodromes within a State, including any alterations made to the list and any corresponding alterations necessary on the aeronautical maps and the dates when such alterations become valid, and all other information concerning any international aerodromes which may be established, shall be communicated by the States concerned to each other and to the International Commission for Air Navigation, which shall notify such information to all of the contracting States. The contracting States may agree to establish international aerodromes at which there may be joint customs services for two or more States.

4. When, by reason of a case of *force majeure*, which must be duly justified, an aircraft crosses the frontier at any other point than those designated, it shall land at the nearest customs aerodrome on its route. If it is forced to to land before reaching this aerodrome it shall inform the nearest police or customs authorities.

It will only be permitted to leave again with the authorization of these authorities, who shall, after verification, stamp the log book and the manifest provided for in paragraph 5; they shall inform the pilot of the customs aerodrome where he must necessarily carry out the formalities of customs clearance.

5. Before departure, or immediately after arrival, according to whether they are going to or coming back from a foreign country, pilots shall show their log books to the authorities of the aerodrome and, if necessary, the manifest of the goods and supplies for the journey which they carry.

6. The manifest is to be kept in conformity with the attached form No. 1.

The goods must be the subject of detailed declarations in conformity with the attached form No. 2, made out by the senders.

Every contracting State has the right to prescribe for the insertion, either on the manifest or on the customs declaration, of such supplementary entries as it may deem necessary.

7. In the case of an aircraft transporting goods the customs officer, before departure, shall examine the manifest and declarations, make the prescribed verifications and sign the log book as well as the manifest. He shall verify his signature with a stamp. He shall seal the goods or set of goods for which such a formality is required.

On arrival the customs officer shall insure that the seal is unbroken, shall pass the goods, shall sign the log book and keep the manifest.

In the case of an aircraft with no goods on board, the log book only shall be signed by the police and customs officials.

The fuel on board shall not be liable to customs duties provided the quantity thereof does not exceed that needed for the journey as defined in the log book.

8. As an exception to the general regulations, certain classes of aircraft, particularly postal aircraft, aircraft belonging to aerial transport companies regularly constituted and authorized, and those belonging to members of recognized touring societies not engaged in the public conveyance of persons or goods, may be freed from the obligations of landing at a customs aerodrome and authorized to begin or end their journey at certain inland aerodromes appointed by the customs and police administration of each State, at which customs formalities shall be complied with.

However, such aircraft shall follow the normal air-route, and make their identity known by signals agreed upon as they fly across the frontier.

Regulations Applicable to Aircraft and Goods.

9. Aircraft landing in foreign countries are in principle liable to customs duties if such exist.

If they are to be re-exported, they shall have the benefit of the regulations as to permit by bond or deposit of the taxes.

In the case of the formation between two or more countries of the Union of touring societies, the aircraft of the said countries will have the benefit of the regulations of the "Tryptique."

10. Goods arriving by aircraft shall be considered as coming from the country where the log book and manifest have been signed by the customs officer.

As regards their origin and the different customs régimes, they are liable to the regulations of the same kind as are applicable to goods imported by land or sea.

11. With regard to goods exported in discharge of a temporary receiving or bonded account or liable to inland taxes, the senders shall prove their right to send the goods abroad by producing a certificate from the customs of the place of destination.

AIR TRANSIT.

12. When an aircraft to reach its destination must fly over one or more contracting States, without prejudice to the right of sovereignty of each of the contracting States, two cases must be distinguished:—

(1) If the aircraft neither sets down nor takes up passengers or goods, it is bound only to keep to the normal air route and make itself known by signals when passing over the points designated for such purpose.

(2) In other cases, it shall be bound to land at a customs aerodrome and the name of such aerodrome shall be entered in the log book before departure. On landing, the customs authorities shall examine the papers and the cargo, and take, if need be, the necessary steps to insure the re-exportation of the craft and goods or the payment of the dues.

The provisions of paragraph 9 (2) are applicable to goods to be re-exported.

If the aircraft sets down or takes up goods, the customs officer shall verify the fact on the manifest, duly completed, and shall affix, if necessary, a new seal.

Customs aerodromes are to be established by the governments in their respective territories and ships embarking on or arriving from international flights must depart from or arrive at these aerodromes promptly and in turn must as promptly be inspected and given their necessary papers and permission to continue their flights.

It will be readily seen from these international rules outlined briefly in this issue that some definite and intelligent organization must be created by each contracting government to insure proper execution of the provisions. Certainly no one or two officials in the Department of State or Department of Commerce or War Department will be capable of dealing with international aviation as set forth in detail in the Treaty.

The Department of State, although to some extent interested, would not be capable of making the inspections of airworthiness and competency, of customs examinations, of weather reports and so forth. And similarly the Department of Commerce, already a huge body and a busy one, would hardly be deemed capable of undertaking these many additional duties, while of course it is readily agreed that international aviation will be almost entirely a commercial proposition and has no place in the military establishment and consequently cannot be properly placed under the War Department.

As a result there is but one conclusion and but one solution to the problem if this country signs the Peace Treaty and that is in the establishment of a separate Department of Aeronautics similar to the one outlined in a recent issue of AUTOMOTIVE INDUSTRIES and which would control all commercial aviation in this country and in its international intercourse and at the same time co-operate with the Naval, Military and Postal air authorities to insure the widest development of the new science.

A Department as proposed with a Commercial Division, a Technical Division and an International Division working co-operatively with an Advisory Board composed of representatives of the other government departments, and under a Director, would insure the most efficient execution of the international laws.

Flat Panels and No Surface Checks

IN the drying of wood for industrial purposes suitable precautions must be taken not to reduce the moisture content too much. Wood panels over-dried have a tendency to warp and twist.

An automatic method of insuring the proper moisture content in dried panels is proposed by the Forest Products Laboratory. This is what may be called the "maximum humidity method," in which the relative humidity of the air in the kiln or drying room is regulated so as to remain at the highest level which will permit the wood to dry to the desired degree (and no further) in a reasonable length of time. By this method, checking of face veneer is also prevented.

The maximum-humidity method lends itself to the most convenient and economical handling of the panel-drying operation. As there is little danger of over-drying, the stock may be left in the drying chamber for any reasonable length of time beyond the minimum required. Thus, thin panels and thick panels may be taken from the press and placed in the kiln at the same time, and removed at the same time, even though the thin panels dried much quicker.

For panels made up of normally dry veneer, a kiln temperature of 120 deg. Fahr. throughout the drying period is a good schedule to follow. If with this temperature the humidity is maintained at 46 per cent, the panels will come uniformly to a final moisture content of about 8 per cent within a reasonable drying period. If the same temperature is used and the humidity is maintained at 57 per cent, the panels will not dry appreciably below 10 per cent.

Stowaway Barred from Aircraft

EDWARD BALLANTYNE, the English boy who gained fame as the first aircraft stowaway on an international trip, when he came to this country with the R34, has been sentenced never again to be a member of an airship's crew. This sentence was imposed upon him by British naval officers, after he was severely scolded for adding his weight to a crew when it had been decided that he should be dropped to lighten the load. Ballantyne is quoted as saying that he would have preferred a year's imprisonment.

Research on the German Truck Collection

It is with much satisfaction that AUTOMOTIVE INDUSTRIES foretells that much technical data will soon be available regarding the German trucks and that this data will be available for publication to supplement the articles already printed from the data prepared by Lieut. Col. A. J. Slade.

THE research on the German truck collection which has been the subject of descriptive articles in AUTOMOTIVE INDUSTRIES during a number of weeks past, is well under way and progressing in a manner which will soon result in all the technical data regarding these vehicles, which may be of value to the automotive industry, being made public.

Since the collection reached this country and was placed in the Motor Transport Corps shops at Camp Holabird, Baltimore, plans have been under way for making thorough studies of the individual vehicles and their component units and parts. It was planned at one time to supply the necessary skilled personnel through the cooperation of the Society of Automotive Engineers with the National Automobile Chamber of Commerce and the Motor and Accessories Manufacturers' Association, but this plan did not develop in a manner to fully meet expectations, and the following program has been adopted and is being carried through:

The Personnel

Capt. G. R. Young, of the Engineer Corps of the Army, formerly lieutenant-colonel in the A. E. F. in charge of Motor Transport affairs at G. H. Q., is directing the work as chief of the Motor Transport Corps engineering branch. The trucks, passenger car chassis and spare parts, comprising the collection now at Camp Holabird, are being transferred to the Bureau of Standards at Washington, where a staff composed of men attached to the Bureau and the M. T. C., including Capt. C. T. Coleman, who served in the M. T. C. in France, both in connection with operations in combat areas and reconstruction at the overhaul park at Sampigny, is disassembling the vehicles and placing the engines and other principal units of particular interest in an exhibition building specially assigned for the purpose, where the details of design and construction can be investigated thoroughly by the engineering staff at the bureau, as well as by any representatives of the automotive industry accredited by the S. A. E., N. A. A. C. or M. & A. M. A., in accordance with bulletins which have been issued by those organizations.

The manner in which the exhibit is being displayed will afford an ideal opportunity for those interested to examine and study in detail all the features in regard to which they may desire information.

In the testing laboratory of the bureau, several dynamometers have been made available, on which the engines are being tested and the results recorded on the standard S. A. E. engine testing forms, showing torque, horsepower, fuel consumption, etc. Tests already made show the desirability of carrying through these laboratory tests before making the comparative road performance tests of the complete vehicles, which will be done later, as it has been found that carbureter adjustments or alterations made necessary to burn the various fuels used in the German transport service have affected the engine performance when using commercial American gasoline.

> While these tests are being conducted the engineering branch of the Motor Transport Corps will be pleased to receive the assistance, advice or suggestions of engineers particularly interested in this phase of the work.

A dynamometer will also be used for determining the efficiency of transmissions and final drives, especially the indirect drive transmission gear units, the unusual types of double reduction jackshafts, and shaft-drive rear axles.

After the laboratory tests of units have been completed and the adjustments verified for the most efficient operation, the vehicles will be successively reassembled and road performance tests conducted in comparison with standard American types of trucks.

While disassembled, the dimensions of all component parts will be recorded on forms which have been specially prepared for the purpose, which will include for the engines bore and stroke, piston displacement, compression volume, valve timing, crank and cam-shaft mountings, gear arrangements, weights of parts, analyses of materials, etc. For the clutches, transmissions, axles, etc., similar data regarding dimensions, weights and materials will be recorded and drawings will be made of features which may vary from familiar American practice. All the parts and assemblies are being photographed and when entirely completed the data recorded will supply a comprehensive description and analysis of these German vehicles.

Passenger Car Chassis

Three light passenger car chassis secured from one of the German overhaul parks will be included in the studies, and a number of typical examples of the types of trucks used in the French and British armies, several of which were also used by the A. E. F., will be subjected to similar analysis when received from abroad.

The research work will be completed on the vehicles in the order in which they are taken for examination. After the publication of two more general articles on these trucks by Lieutenant-Colonel Slade, covering transmission groups and power plants, completing the series which he has been writing for AUTOMOTIVE INDUSTRIES, this data will become available for publication and will follow as it is issued by those in charge of the research. This will consist of detailed descriptions of the trucks, together with drawings, photographs and mechanical data. Colonel Slade will assist in preparing this data for publication.

Johansson, Apostle of Mechanical Accuracy, in America

Only one man, so far as the records show, has measured 0.000001 of an inch, and this man has made it possible for other men to do it. Thus he stands in a class by himself. He has set the standard by which standardizing organizations make their standards. Until recently his gage blocks were sent to this country, but now he has come to America, the country of his youth but not his birth, to set up an establishment to make these wonderful measuring tools here.

TOOL makers of the world were startled, several years ago, by the announcement of new standards, inconceivable almost in their minute gradations, that had been set for their profession by a Swedish mechanic and steel fabricator. Unknown then, with his methods scarcely credited and his workmanship often doubted, the persevering mechanic, with his standards everywhere accepted and himself acclaimed as their inventor, has come to America and has taken over a large plant for the manufacture of his instruments and tools of precision.

This article is in brief, somewhat, his life story and his aims, showing, perhaps, how he has added something of romance and wonder to the mechanical trade—his second coming to America being no more than a culmination of the struggles that have ended in his success.

The mechanic is Carl Edward Johansson. The standard was nothing more than a fraction of an inch, but a fraction so minute that even an engineer, accustomed as he may be to exact standards and precise measurements, must consider the finding of it a marvel of human ingenuity and perseverance. The fraction is one one-millionth part of an inch. Johansson found it and set it to commercial usage—and, therein is the wonder in which the Swedish steel worker has been invested.

C. E. Johansson

The Johansson factories, both in this country and in Sweden, to-day are turning out by the hundreds, for the use of manufacturers and tool makers throughout the world, his gage blocks in which the limits of precision are one one-hundred thousandth part of an inch. The master gage with which they are fashioned has a precision of just ten times as minute, or the millionth part of the inch, expressed in decimals as 0 000001. This gage is made with a precision that does not vary greater than two ten-millionths part of the inch. That represents the greatest error permitted in the instrument that Johansson has made for the working out of his commercial instruments, and it is, perhaps, one of the most delicately measured pieces of machinery, at least for commercial uses, in the world.

Conception of the fractions or the decimals to which the system has been carried seems almost impossible to the average layman, who soon finds himself immersed in a maze of calculations and divisions in his attempts to comprehend the small limits of such a measurement. It is said that a measure of one two-thousandth part of an inch for commercial purposes was considered the absolute practicable limit before the Johansson blocks were invented. But such a measure is many times that of the millionth part involved in the master gage or the hundred-thousandth of an inch of the commercial instruments.

Illustrated by a Hair

Likewise, it is said that a human hair measures two-thousandths of an inch. If this be true, then to comprehend the limits set in the blocks sold by Johansson, one must think of splitting a hair into 200 equal parts, each of which would represent the one hundred thousandth of the inch. Further, to conceive the precision of the master gage, the hair must be split ten more times, or into two thousand parts. That is the degree of measure claimed for and accorded to the once unknown Swedish tool maker. And upon that, in contrast with the men of industry whose fame rests upon the magnitude of their accomplishments, the fame of Johansson must rest upon the minuteness of his product.

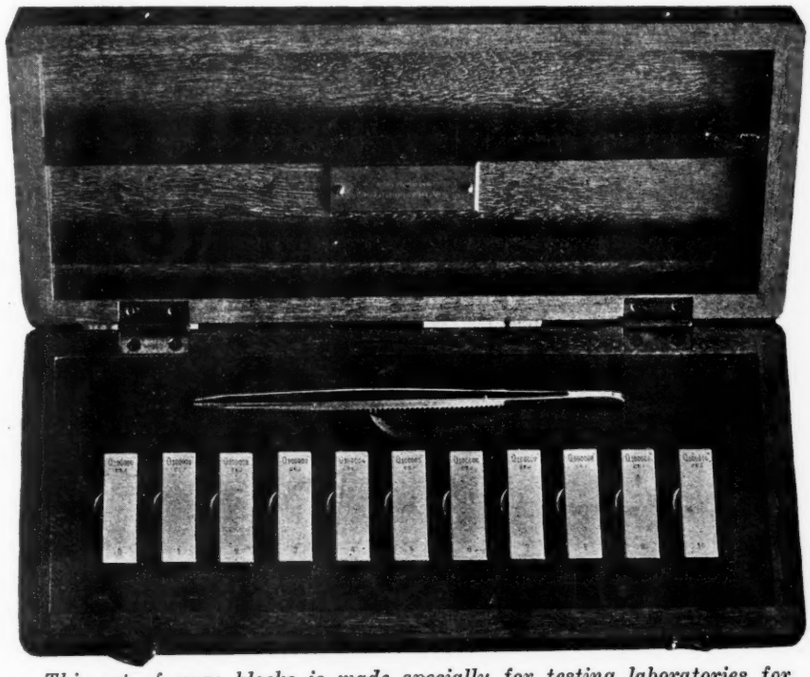
But this account should better concern itself with the human side of the life and accomplishment of the man. The mathematics and the decimals of the limits of his system should be left to the technical engineer or the student of precision. This concerns itself with the manner in which Johansson found his precision limits and the manner in which he has made them commercially practical.

Biographically, Johansson is 55 years old. He was born in the little town of Frotuna, Province of Westmanland, Sweden, and made his first venture, after finishing his course in the public schools, by coming to America in the third-class steerage of one of the vessels of that day. For three years he remained here, working in several indus-

trial plants and attending the Gustavus Adolphus College at St. Peter, Minnesota. Then he returned to his native Sweden, at the age of 21 years, choosing the city of Eskilstuna for his home. He worked at a machine shop, passed the examinations and graduated from the technical school of that place, and became a tool maker.

From that point, which marks his employment in the Swedish government arsenal at Eskilstuna, it may be said that his long search for precision began. The search was one that was to take up many years of his life, that was to lead him into new and unconsidered difficulties, but that was to end, finally, in his "discovery" of the limits of precision that have crowned his working life.

The young man Johansson soon was making special machinery and tools, among which were inspection gages for the arsenal work. He became toolroom foreman and was succeeding perhaps even better than he had hoped for himself. But everywhere it seemed to this energetic worker that accuracy was lacking in the making of parts and tools, that workmen continually were arguing over measurements and that standards of precision constantly were coming up for discussion, their difficulties hampering and retarding work.



This set of gage blocks is made specially for testing laboratories for checking purposes. The eleven blocks comprising the set measure 0.100000, 0.100001, 0.100002, 0.100010 *in. respectively*

Johansson was impressed and saw the possibilities of bettering the conditions surrounding himself and his fellow workmen in the respect of measurements. Calipers, scales, micrometers, and other instruments of supposed precision were at continual variance, and the result was hamper and delay. Something was lacking—and Johansson set out to correct the lack, with unflagging efforts, unlike those of the many other men who have seen a need for better mechanical tools and instruments but who have not possessed the courage of sticking that builds up an idea to an accomplished fact.

The Swedish arsenal changed its method of making rifles, in effect, "manufacturing" them instead of having them made by individual workers. Systems of tolerance limits were set, so that the parts might be made on an interchangeable plan, in quantity, that permitted assemblage without individual fitting. The special measuring apparatus failed to function properly, different measurements for similar operations resulted from the work of different men, and difficulties of precision constantly presented themselves—difficulties that most modern machine shops and toolrooms can scarcely credit to-day with the present smooth running of lathes and drills and presses, all synchronized with perfect gages in their work of turning out standardized parts.

But to Johansson and the Swedish factory, the problem was a real one. Each workman tried to solve it individually, turning out little solid blocks of steel that served as gages. These took various shapes and measures that accumulated rapidly, but changed as often as design or dimension was altered. The system was the best then known, and even Germany, supposedly more efficient in machine shop practice than Sweden, had nothing better, as Johansson discovered on a visit in 1896 to the Mauser Arms Factory in that country. He was struck there by the great number of these blocks that were required, separate ones being required for each operation and for each varying size. The Swedish mechanic soon saw that this was wasteful, as perhaps he long had suspected, and that no shop or arsenal could be expected to own sufficient gages to cover all the measurements and all the operations that might be required in large work.

Some time during his life, this man had conceived the plan of making a set of master gages in which was combined a number of separate blocks, each as nearly perfect mechanically as could be attained. Two or more of these could be used in combination to make a certain measurement he planned, the resulting whole being equal to the exact limits required. The difficulties were few in theory, but in practice embraced the finding of flat and parallel surfaces. Deviations could be countenanced not at all, and mechanical errors, of necessity, could not be considered.

Plane surfaces that were parallel, perhaps, will never exist except in the theoretical problems of a geometrician. Surfaces cannot be made flat to the degree of exactitude comprehended in the problems of a mathematician or a student of physics. They only can be approached mechanically within the limits of the making instrument and medium of manufacture. It was Johansson's problem to reduce these limits to the necessarily precise specifications required in his intended plan.

His success in reaching these limits already has been told. That he has reached the standards claimed has been admitted by the standards bureaus of several European and American countries. How he reached these standards of precision, the maker has outlined only by saying that he worked for many years on them. His methods are yet a secret, and perhaps will so continue for a long period. But his success is unquestioned.

He has told that he found it necessary to eliminate all instruments of screw and thread construction for measuring and checking the blocks. He has said likewise that he could not use the common optical methods, entailing light interference, in this work, and he has told also that he has invented a new measuring machine capable of measuring with slight inaccuracies. He has related that he was forced to study very seriously the nature of steel, with considerations dependent upon the physical prop-

erties of molecular motion, expansion and contraction due to temperature changes and the hardening and changes that are due to many causes.

The first set of blocks came out in 1897, a rough and more or less unsuccessful forerunner of the present highly successful commercial product. Nine years later, after constant study and continuous work, Johansson had overcome the problems of the steel in which he worked, and it was yet another five years—bringing the date up to 1911—before he had completed his arrangements and finished his work so that his blocks might be manufactured commercially. This could be done only when it was possible to guarantee the accuracy without the possibility of mistakes.

As has been shown briefly, the complete system requires a number of blocks, each of which is of slightly different dimensions. To obtain, then, a desired dimension, several of these blocks are placed together, the whole becoming the required measure. This means that the total errors of each block would be added to the whole, and, consequently, if error had crept in the manufacture, the combined faults would be so large that the blocks could not be used.

Thus, it may be seen easily why Johansson had to search so patiently for the means to true each block, with each surface parallel in the exact sense. Failure would condemn the value and the use, making valueless his years of labor and expended energy.

In practice, some rather startling facts have been shown. The first and perhaps most interesting is the cohesive quality of flat surfaces. Two of the gage blocks placed together adhere so strongly that a surprising force is required to draw them apart. This is explained as being due probably to the attraction and influence of the molecules of the different blocks. Another fact is the changes made in the precisely fashioned pieces by temperature. The inventor recently showed a group of men at New York how two pieces of fine gradations could be made to change size within five seconds from the influence of nothing more than the heat of a man's hand. Another, is that the blocks themselves are self-checking, one against another, and that by so using them, contrasting one with another, it may be shown whether or not the limits of inaccuracy have been reached.

In Business for Himself

The first commercial manufacture of the blocks was accomplished in 1911, when Johansson resigned from the Swedish arsenal at which he had worked so long and became general manager of the new company. For some years he continued their manufacture at Eskilstuna, shipping them all over the world, in competition with every maker of precision instruments, favored though they might be with less distance of shipment to markets or the non-necessity of paying customs duties.

Now, however, Johansson has come to America, for the second emigration of his life. He arrived here early this month, with his family, and plans to remain for some time. His affairs in this country are being developed by a separate company—C. E. Johansson, Inc., with offices and a temporary plant at New York City. The company also has acquired recently the plant of the Welte Piano Co. at Poughkeepsie, N. Y., a modern three-story brick structure, that will be equipped for the manufacture of the gage blocks, plug, snap and ring gages and other precision measuring devices originated by Johansson.

Prevention of End Checking in Seasoning Lumber

AUTOMOBILE body builders and aircraft manufacturers will be specially interested in the following information on how to prevent end checking of lumber undergoing seasoning, given out by the Forest Products Laboratory, Madison, Wis.:

Wood, whether in the form of logs, lumber, timber, shaped blanks, or veneer, will split and check at the ends during seasoning, if drying is allowed to go on at a natural rate through the end grain. To retard the rate of drying from the ends, it is necessary to cover them with some protective coating.

The law of end coatings, in simple terms, is that the harder and greener the wood, the more effective must be the coating. In its experiments to determine the practicality of various coatings and end dips, the Forest Products Laboratory found the following to be true:

Paint is convenient to handle, but is of low effectiveness.

White lead is convenient to handle, and is of medium effectiveness.

Lorac, a commercial compound, is convenient to handle, and is of considerable effectiveness.

Rosin-lampblack is inconvenient to handle, but is of high effectiveness.

Rosin-lampblack is made according to the following formula:

Clear grade rosin—60 parts by weight
Lampblack — 1 part by weight

The rosin should be melted but not allowed to boil or froth. The lampblack should then be thoroughly stirred in. The ends of the sticks should be dipped in this molten mixture to a distance of about ½ in. When hard, the coating should be smooth, free from bubbles, shiny, and an eighth of an inch thick over the end.

If the stock is to be subjected to rough handling which might cause the coating to chip when cool, linseed oil may be added, in the proportion of 1 to 15 by weight, but this will have a tendency to make the coating excessively soft in the kiln at temperatures above 130 deg. Fahr.

War and Motor Cars in Maps

AUTOMOBILE routes in the United States and Peace Conference boundary lines in Europe feature the maps in the After-War Atlas and Gazetteer of the World, compiled by the Reynolds Publishing Co., Inc. There are also a number of graphic maps, showing when each country declared war, how the world was aligned in the war and other interesting information. There are maps of the chief railroad systems of this country and new maps of the European countries, showing the changes that followed the war. Motor vehicles are given a prominent place in the compilation of the maps, for in addition to the motor roads on the U. S. map, there are special points of interest pointed out, and the map of each state is accompanied by a brief statement of the motor vehicle registration laws of the state.

SINCE its inauguration in 1863 the Cape Copper Company, which has recently closed its mines in Namaqualand, has paid out in dividends nearly $1,090 on every $50 share.

Some New Johansson Measuring Appliances

When Mr. Johansson came back to America last week to open a factory which will make his blocks in this country, he was not content to rest on his well won laurels but he called together a few trade journal representatives and told them of new gage blocks that he has perfected. One of the sets is for the measurement of angles to a degree never before attempted

At a gathering of trade paper representatives last week, C. E. Johansson, the Swedish manufacturer of gage blocks and other precision measuring devices, explained some of the more recent developments of his laboratory. He exhibited a table of allowances and tolerances, in which seven different classes of fits are enumerated as follows: Light running fit, running fit, sliding fit, push fit, driving fit, light press fit and press fit. The total tolerances are smallest in the sliding and driving fit, viz., 0.000053 in. for a sliding fit in a nominal 1-in. hole, and 0.00055 in. for a driving fit.

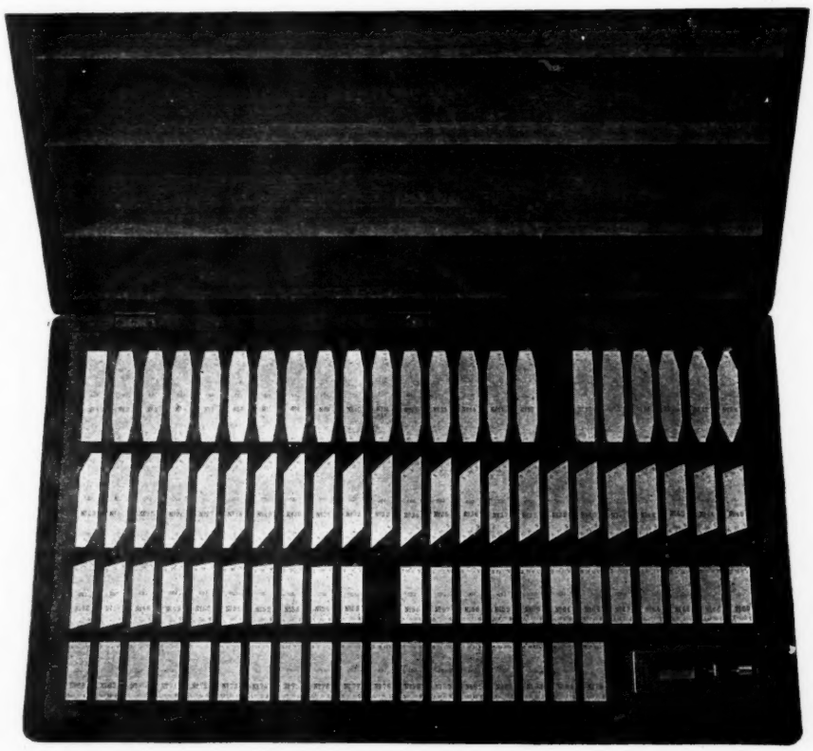
In order to make measurements of such extreme accuracy, it is necessary to have reliable standards, and the different Johansson block sets serve this purpose. The No. 1 set, which is the one in most common use, permits of obtaining measurements in steps of 1/10,000 of an inch. The blocks in this set are guaranteed to be accurate within a limit of 1/100,000 of an inch. Other sets are made in which the steps are one-half and one-quarter of a thousandth of an inch, and metric sets are, of course, also produced.

For institutions like our Bureau of Standards, which make a specialty of inspecting very fine gages, it is necessary to have gage blocks of a still greater degree of accuracy. For such Johansson has developed the series of gage blocks shown in the accompanying photograph, which measures from 0.1 to 0.100010 in., in steps of 0.000001 in. The limits of accuracy in these blocks is from 0.0000002 to 0.0000003 in. Johansson explained the necessity of being able to measure to closer limits than the smallest division of the gage block, in order to be sure to have the blocks within the limits guaranteed. He illustrated this by making reference to the familiar practice of allowing a factor of safety in building construction and other engineering work.

For instance, if a floor is wanted to carry a certain number of tons, it is built not so that it will just carry that load and fail under a slightly increased load, but instead it is made so that it will not fail unless the load has been multiplied five or six times. Similarly, if it is necessary to manufacture gage blocks, to dimensions expressed in 1/1,000,000 part of an inch, then it is necessary to be able to measure to a still higher degree of accuracy.

Another product which Johansson has recently developed consists of a set of angle blocks, which will be a companion set to the gage blocks. These consist of blocks similar in shape to the gage blocks, but having part of one or more of their sides finished off at an angle. The angle blocks are combined in the same way as the gage blocks to form angles of different magnitude, and by means of a set of 85 blocks, it is possible to obtain all angles in steps of 1 deg. up to 10 deg. and in steps of 1 min. from 10 deg. to a complete circle of 360 deg. These angle blocks can be used in combination with the gage blocks, as in making milling cutters.

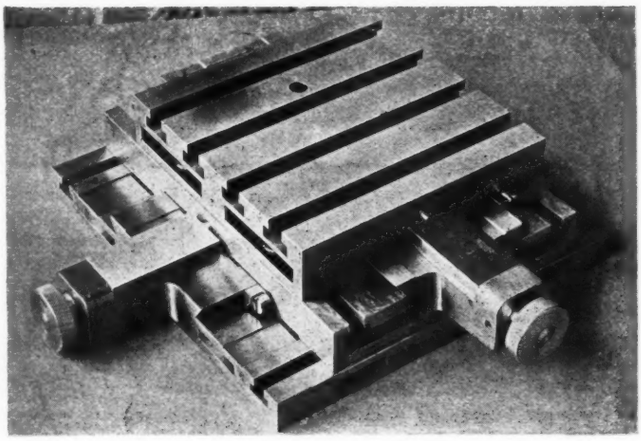
A combination micrometer is also being made which consists of two substantial jaws held in a clamp, in a rigid manner. By placing different gage blocks between the jaws in the clamp, the opening of the micrometer can be made suitable for measuring small or large objects. This, of course, is much preferable to the use of a long micrometer screw.



Angle set, by combining which all angles in steps of 1 minute from 10 to 360 deg. are accurately measured

The advantages claimed for this combination micrometer are that it is very rigid, and that, inasmuch as the axis of the micrometer screw is far removed from the clamp, it is possible to measure quite deep objects. This combination micrometer is also to be made in another size, which will permit of making measurements up to 8 in.

For making rapid measurements of parts on which work is being done in the grinding machine, Johansson has developed a tolerance indicator. This instrument has the advantage over an ordinary snap gage that it shows the exact amount the piece is above the desired size. The indicator stops in the position to which it moves when passed over the work, and the pointer is brought back to the zero position by pressing on a button. Four sizes of this indicator are to be made, with ranges of 1 in., 2 in., 3 in. and 4 in.

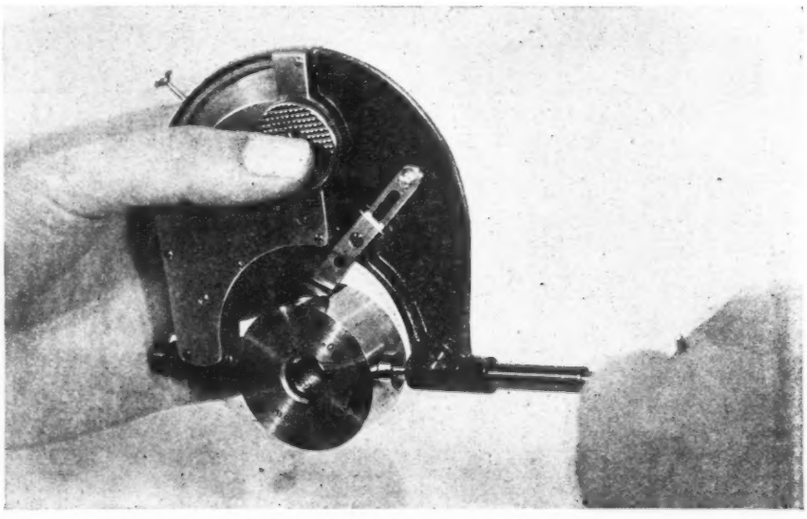


Compound slide used in laying out work requiring a high degree of accuracy, such as drill jigs. Johansson gage blocks are used in conjunction with this slide

One of the photographs shows a new dividing apparatus, perfected by Johansson. It is intended particularly for use in making drilling jigs and similar work and serves in laying out the centers of the holes. The device here shown is placed on a milling table, with the jig in which the holes are to be located on top of it, fastened in place. The device consists of one transverse and one longitudinal slide, each of which can be moved by means of a thumb screw. The position of the two slides, relative to the lugs through which the adjusting screws are screwed, is determined by gage blocks, and by taking out one of these gage blocks, it is an easy matter to move the slide accurately any desired distance.

Another recent Johansson product is a gage suitable for inspection work. The part to be gaged is placed between a fixed and movable head and any error in the dimension measured is indicated on a large-sized open scale, which can be easily read from a distance. The heads are opened for the insertion and removal of pieces by means of a foot lever with flexible connection.

Johansson gave a very convincing demonstration of the accuracy of his gage blocks. By means of a 1-in. block and two long, plane blocks applied to the sides of the former, he produced a snap gage. Then he introduced the end of a 1-in. plug gage between the jaws of this snap gage and the fit was so close that the whole assembly, which was held together only by molecular attraction or whatever force it is that causes these blocks to "wring" together, could be lifted from the table by holding the plug gage. Next the temperature of the gage blocks was slightly raised by holding them in the hollow of the hand for 5 seconds, and this so increased the span of the snap gage that it would no longer stick to the plug. By warming up the plug gage in a similar manner the experiment could be repeated.



Tolerance indicator which may be used to gage running work

Wood Facts

IN experiments made by the Forest Products Laboratory, it was found that varnishes do not entirely prevent the transmission of moisture into wood, but merely retard it, and that apparently there is no difference in moisture absorption through the coating due to the species of wood used.

The panels used in the experiments were of yellow birch, basswood, red gum, African mahogany, white ash, white pine, Sitka spruce, Southern yellow pine, bald cypress, incense cedar, white oak, Western yellow pine, Port Orford cedar, and sugar pine.

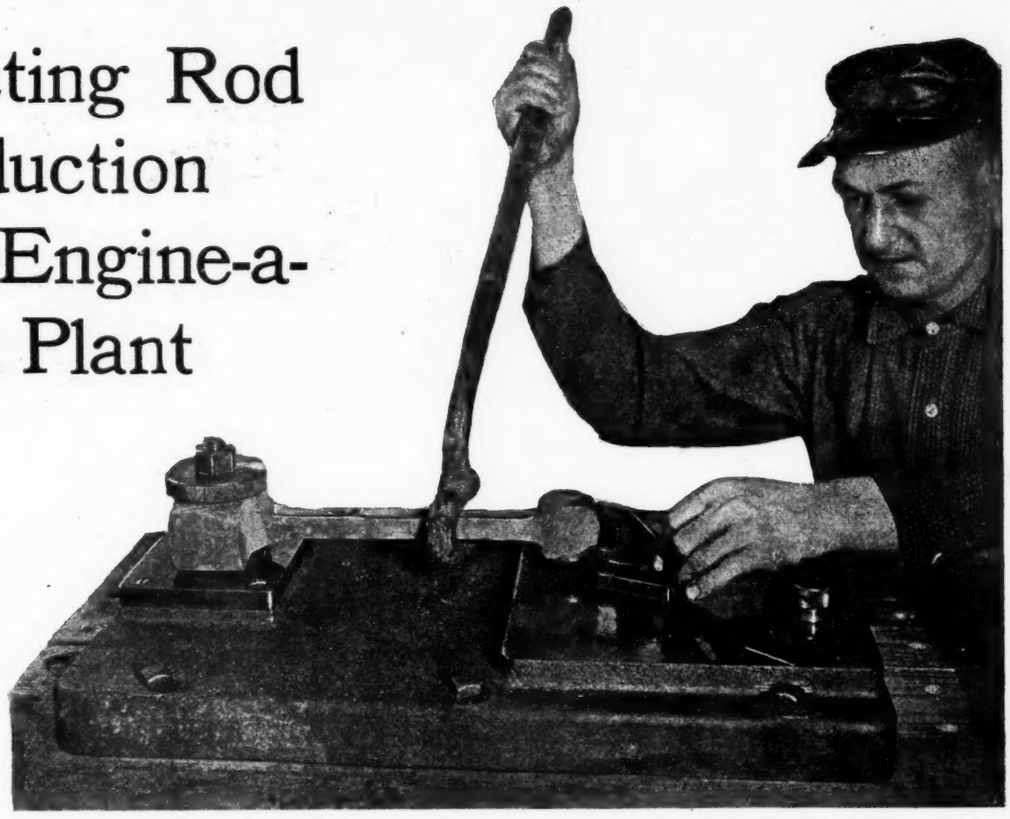
Three coats of high-grade spar varnish were applied to four panels of each species. Two panels of each species were brush-coated and two were dipped by a special dipping machine designed to secure an even coating. The panels were allowed to dry 72 hours between coats and 10 days after the final coat before they were given the moisture-resistance test.

The moisture-resistance test consisted in exposing the panels for 17 days to a humidity of 95-100 per cent, or in an atmosphere practically saturated with moisture.

At the end of this test, it was found that all the brush-coated panels had absorbed between 5 and 6.5 grams of moisture per square foot of surface, and the dipped panels between 4 and 5 grams. Such variations in amount of absorption as appeared could easily have been due to inequalities in the application of the varnish. It was quite noticeable that the dipping process produced a more moisture-resistant coating than brushing. In over 300,000 tests on the various species of wood grown in the United States, no effect upon the mechanical properties of wood due to its change from sapwood into heartwood has ever been noticed. Any difference in the strength of heartwood and sapwood can usually be explained by the growth and density of the wood.

In other than mechanical properties, there are differences between heartwood and sapwood.

Connecting Rod Production in a 50-Engine-a-Day Plant



1 — *Inspection and straightening operation for twisted connecting-rod forging*

The best thing about this story is that it represents ingenuity and resourcefulness on the part of the production manager, rather than an expenditure for special machinery. The equipment is that which can be bought in the open market, and by devices added, or changes that can be made in any shop, these machines are made to answer the purpose. There are many small plants that could be improved by such ingenuity.

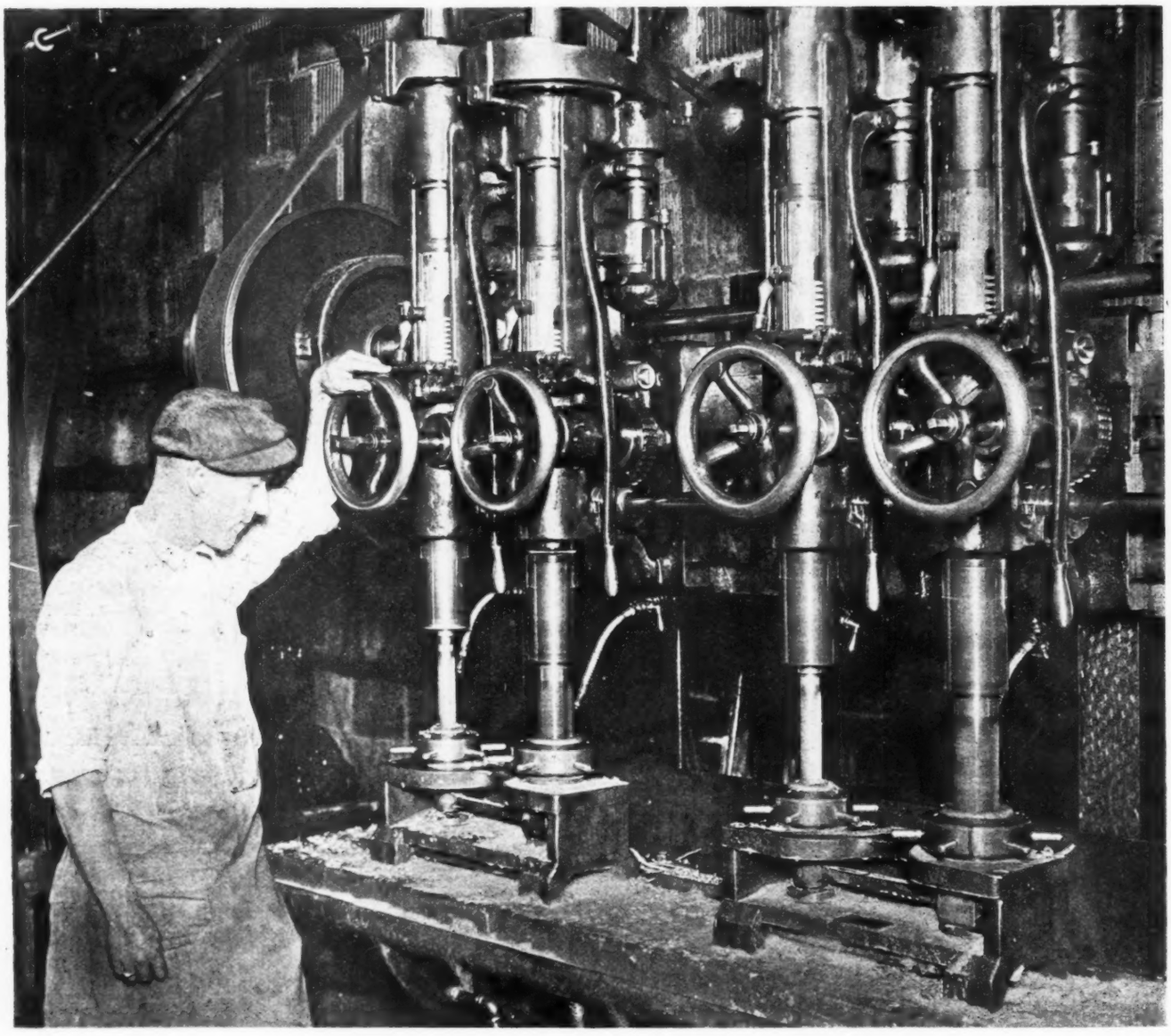
By J. Edward Schipper

INGENUITY in the use of standard tools is highly essential in cutting costs in the manufacture of small and medium numbers of engines. Many concerns have severely handicapped themselves by purchasing costly machinery before production has reached the point where this expense has been justified.

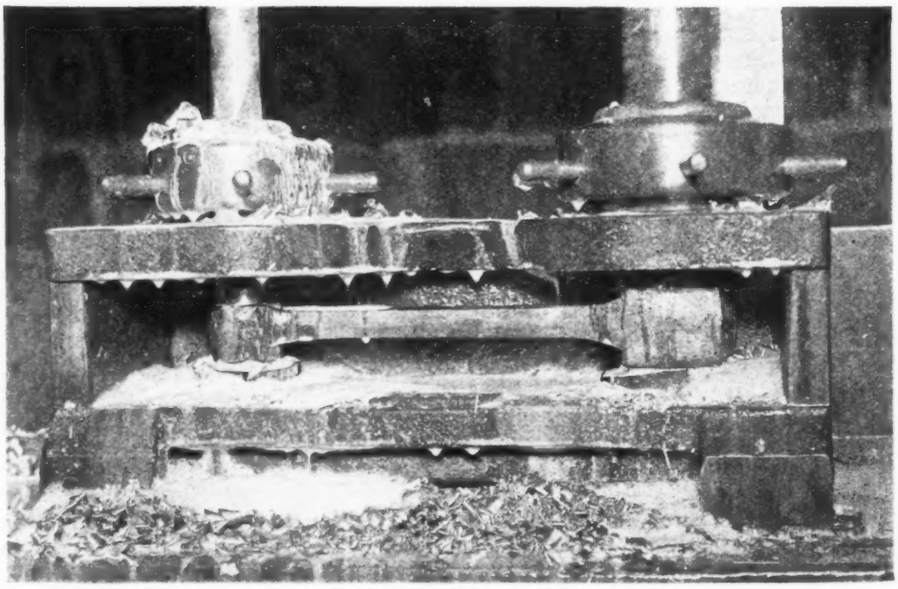
By taking standard forms of drill press, lathe, etc., and adapting them particularly to the job in hand, excellent production tools are provided without the purchase of expensive special machinery which burdens the shop to such an extent that it is a long while before the profits on the job upon which the machine is working catch up to the expensive installation. Machinery which runs ahead of the normal shop production is an extravagance. It is absurd to have the machine run a short time and then stand idle until the demand for the part produced by the machine again makes it necessary to run it.

The operations shown and described here are employed in the manufacture of the Hinkley engine, in a plant which is designed for an efficient production of 50 engines a day. A study of these operations will bring out the point that very little of what might be called special machinery is employed, practically all of the tools being of standard production type, such as can be bought in the open market. In many instances the original machine has been revamped to make it a production tool, particularly in the case of single-spindle machines which have, by means of redesigned heads, been arranged to perform a multiplicity of operations at the same time. Some of the inspection methods in connection with the manufacture of the connecting rod—the unit selected for description—are also valuable and could be employed to advantage in both larger and smaller shops.

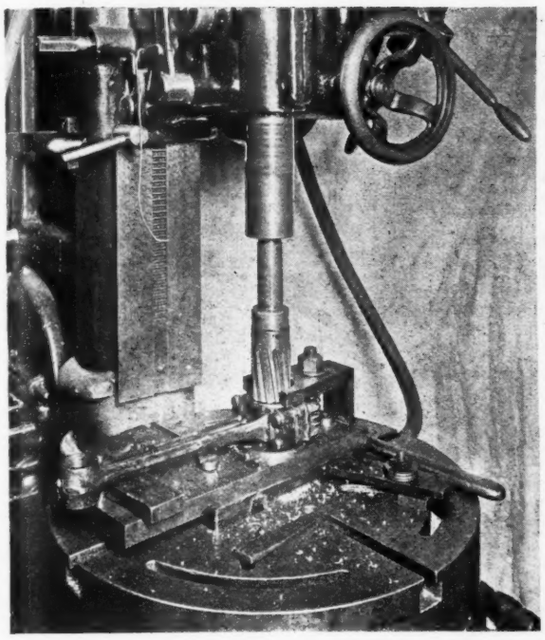
Inspection for straightness is given the blank rod on its arrival at the factory. The forging is inspected for this in two directions—first for twist, and second for bending. Photograph No. 1 shows the inspection for twist and also the method used for straightening minor discrepancies of this nature. A stout, hooked bar fits over the connecting rod, which is clamped down on a surface plate at the big end and gaged on another surface plate at the smaller end. If the rod is twisted, the gage will not touch at both top and bottom, and the bar is used to take out the twist. In gaging for bending, a go-and-no-go gage is employed to indicate that the rod boss is at the proper height above the surface plate at the small end.



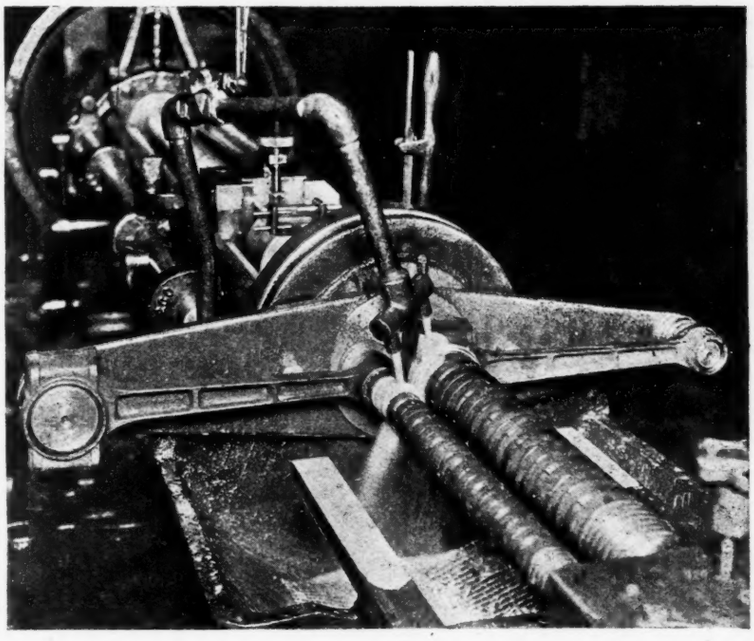
Above—2—Simultaneous drilling of both ends of rod by means of Foote-Burt heavy duty drill press and self-locating jig



To the right—3—Details of self-locating jig showing collar on end of pilot to locate rods endwise and crosswise



4—Reaming operation on big end of connecting-rod. Spot facing is done on the same machine by changing the cutter



5—Broaching large end of one rod and small end of another simultaneously, rods being located by upper and lower centers. This gives a production of 30 per hour instead of 15

Generally the first operation in rod manufacture is to mill the rod, but at the Hinkley plant this is not done. Here the primary manufacturing job is the drilling of the two ends. The rod is located automatically by a fork on the tool at each end of the rod. This fork is located on the split ring bushing of the drill press, as shown in photograph No. 3, that on the large hole locating the rod endwise and that on the small hole locating it sidewise, the location being made on the outside of the forging, providing an accurate determination of the drilling centers.

The machine, which is a Foote-Burt heavy-duty type, and is shown in photograph No. 5, drills two rods, or four holes at once. Besides the two jigs on the machine, there are two other jigs which are set up while the machine is in operation, giving what is known among manufacturers as a single rotation layout, with the set-up proceeding while the drilling operation is taking place. On this machine it takes five minutes per rod, and with the two operations going on simultaneously, a rod is turned out every 2½ min. The machine is standard, with the exception of the fork locating arrangement described, which makes a self-centering proposition.

Time Cut in Half

Time is cut in half on the next operation by so designing the fixture that two rods are broached at once. A regular single Lapointe broach is made use of, and by a fixture which rigidly supports two rods as shown in photograph No. 5, it is possible to broach and burnish the lower end of one rod and the upper end of another simultaneously. The rod is centered and located by means of spindles on the fixture which act as dowels, centering the rod on the holes drilled at the large end of one and at the small end of the other, while the broaching tool itself acts as a centering means for the other end of the rod. This layout has increased the capacity of the broaching machine by 100 per cent, giving a ready production of 30 per hr. in place of 15 per hr. with a single spindle machine.

Probably the most ingenious layout in connection with the manufacture of the rod is the means employed to flat-face both sides of the rod at the same time. The work is done on what was originally a standard Foote-Burt heavy-duty drill press. Photograph No. 10 shows a close-up view of the cutters of this machine, with the splash guard removed to disclose the cutters and the gears which drive them. This entire head and train of gears is a product of the Hinkley tool room. The machine takes care of both ends of the rod at the same time.

A collar is fitted in the opening in the big end of the rod to cut down the size of the hole in the cutter and increase its strength. In the smaller end of the rod, where the hole is relatively small in diameter, this is not necessary. As the tool comes down on the work, guided by the two guide posts shown at the sides of the head in photograph No. 10, the locating pilots, or spindles on the ends of the cutters pass through the holes in the smaller end and in the collar within the big end. These locating pilots are provided with key-ways, which pick up keys located in the bottom cutters, thus transmitting the drive to it and permitting the cutting on four faces at the same time.

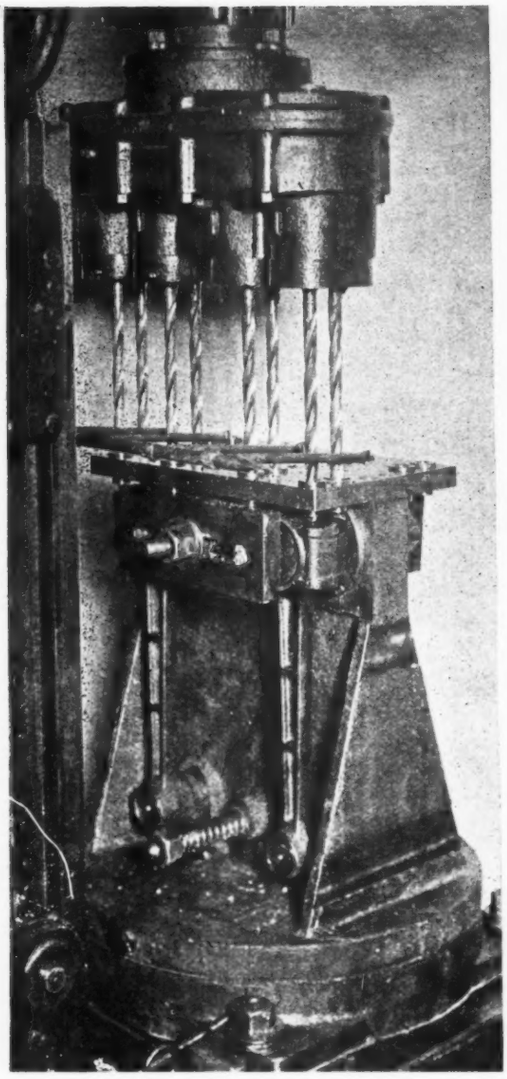
Time Saving on Machine

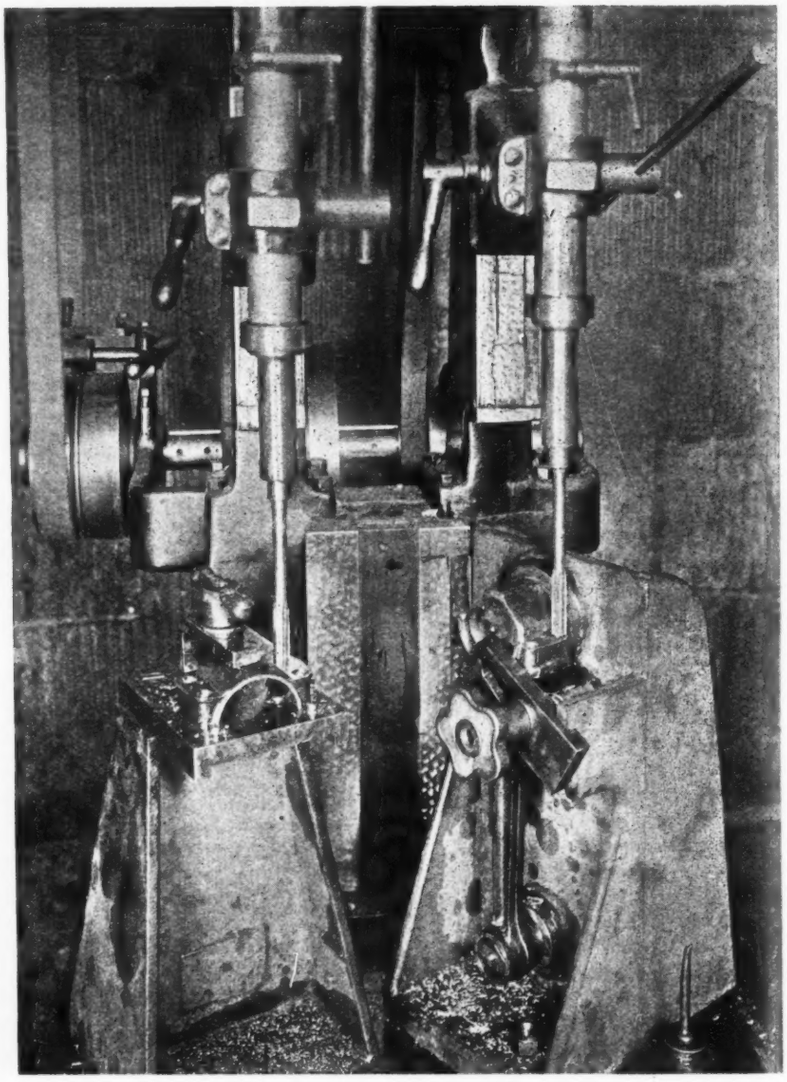
The set-up on the machine is made on the guide posts of the head so that a positive prevention of undercutting the face is given. This machine faces thirty-five rods an hour.

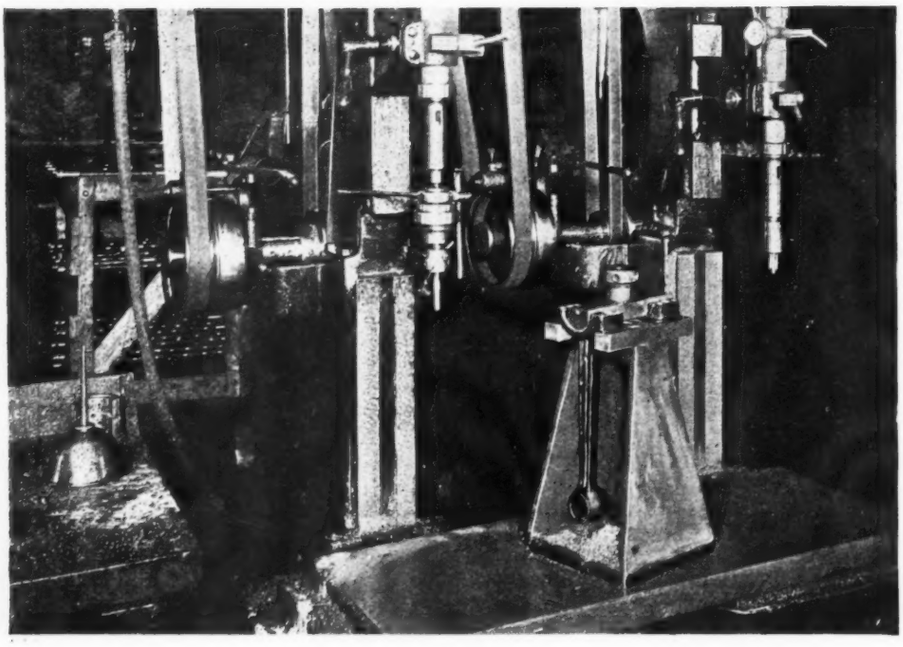
The succeeding operation on the rod, that of drilling the holes for the connecting rod cap bolts, is also performed on a machine which was originally a Foote-Burt heavy-duty drill press on the single spindle type. This has been redesigned by putting on a special head which is clearly shown in photograph No. 6, with a train of gears to drive eight spindles instead of one. These eight spindles drill the four cap-bolt holes in the big end of two rods at one time.

While these two are being drilled, the fixture is so laid out that the other two can be set up on the front of the machine. Photograph No. 6 shows the indexing fixture arrangement with spindle centering devices to locate the rod. The fixture is indexing as it is rotated to the proper position on its own pedestal.

The simple redesigning of the head has given a multiple spindle drill, making the machine a real production



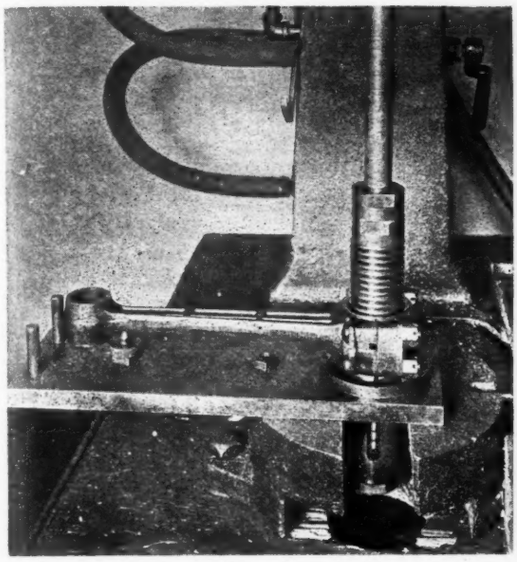




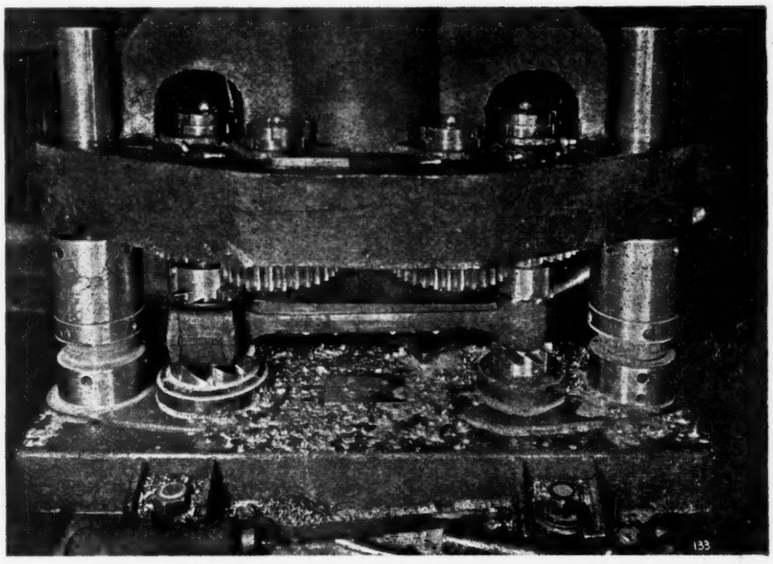
Above to the left — 6 — Eight spindle machine made from a single spindle Foote-Burt heavy duty drill press for drilling connecting-rod cap bolt holes

Above to the right — 7 — Avey sensitive drill with two spindles for connecting-rod cap bolts

To the left—8—In the operations for the bearing retaining screws, two drills are put side by side and a surface slab put across the table of each so that the fixture can be moved from one spindle to the other without changing set-up or location



9—*Broaching and burnishing big end bearing connecting-rod on a hydraulic arbor press*



10—*Milling four faces at once on redesigned single spindle drill press. The head shown in this illustration is a product of the Hinkley tool room and is described fully in the text*

tool and one which is admirably adapted to a shop of this size. It has represented but a small proportion of the money which could be put into a machine to handle a very large production, and at the same time it fits into the scheme and production schedule of a shop of this size.

The finished connecting rod is fitted with an oil pipe to take the pressure oil up to the piston pins and bushings. In order to hold this tube rigidly in position, the blank forging is fitted with webs between the flanges of the I-beam on one side. It is necessary to slot these webs in order to provide for the oil tube, and this operation is performed on a Whitney hand miller. It is a single saw-cut operation requiring but two minutes. Location of the rod is secured by the two centering pilots or spindles in the holes at the upper and lower ends of the rods. The operation is performed on a moving table, the work being brought up to the revolving saw. This operation is simple and will be thoroughly understood from reference to photograph No. 10.

A Cincinnati automatic miller mills the square seat for the connecting rod cap bolts and nuts, and at the same time cuts off the end of the rod. This is another operation where particular adaptability of the standard tool has been shown. Photograph No. 11 illustrates the positions of the cutters and the location of the cut-off saw, which removes the caps from the rods.

Using Standard Machines

The drilling, reaming and tapping of the connecting rod cap bolts, both in the rod and cap, are simple operations requiring no unusual features either in the tools or in the way of jigs or fixtures. The operations are shown in photographs 7 and 8. The machine shown here is an Avey sensitive two-spindle drill, with one spindle for a driving fit for the cap bolts and the other spindle to ream the cap bolt holes oversize.

The tapping operation and the bearing retainer holes are drilled and tapped on similar machines. These are all simple drill press operations, the final one of which is a counter-bore for the bearing retaining screw. Holes also must be drilled for the oil tube, these passing through the upper end of the rod and also at the piston pin bearings. The bearings are then fitted and counter-bored and tapped at an Avey single spindle machine for the bearing retaining screw, which is seated with a flush head.

On account of the necessity of the head being flush, there is an indicator on the counter-boring machine which accurately determines the depth of the cut so that the head of the screw when tightened up as far as it will go will be flush with the face of the cap and rod. These screws are, of course, placed both in the rod and in the cap to retain the two bearing halves.

The putting of the dial indicator on the machine is simply the use of the proverbial ounce of prevention and is a device which materially aids in cutting down rejection on finished inspection.

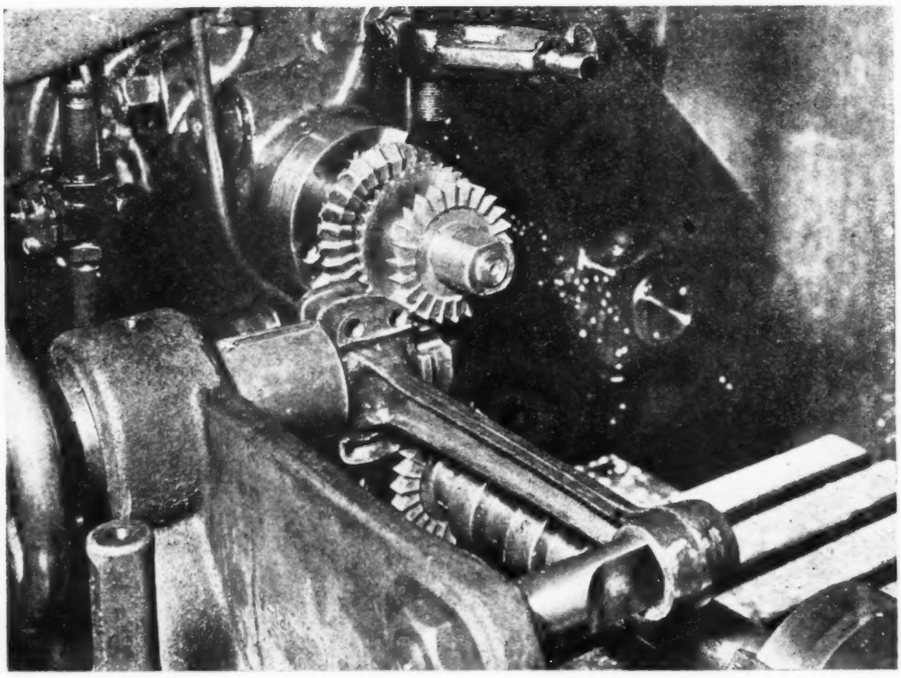
Two Operations on One Machine

With the bearing in place and the cap bolts drawn up, the bearing is reamed on a Weigel heavy-duty sensitive drill press and by a quick change of tools, is spot-faced on this same machine. (Photograph No. 4.) The bearing is then broached and burnished on a hydraulic arbor press. This hydraulic arbor press is shown in photograph No. 15. It is a straight broaching and burnishing operation with the tools designed to give a finished bearing.

The oil tube is driven into the connecting rod through the top, as shown in photograph No. 16. This is a sub-assembly operation, and after the tube is in place the ends are flared over to give a smooth finish. The piston pin is pressed in and the pin bushing is hand reamed. The piston pins are selected by fit.

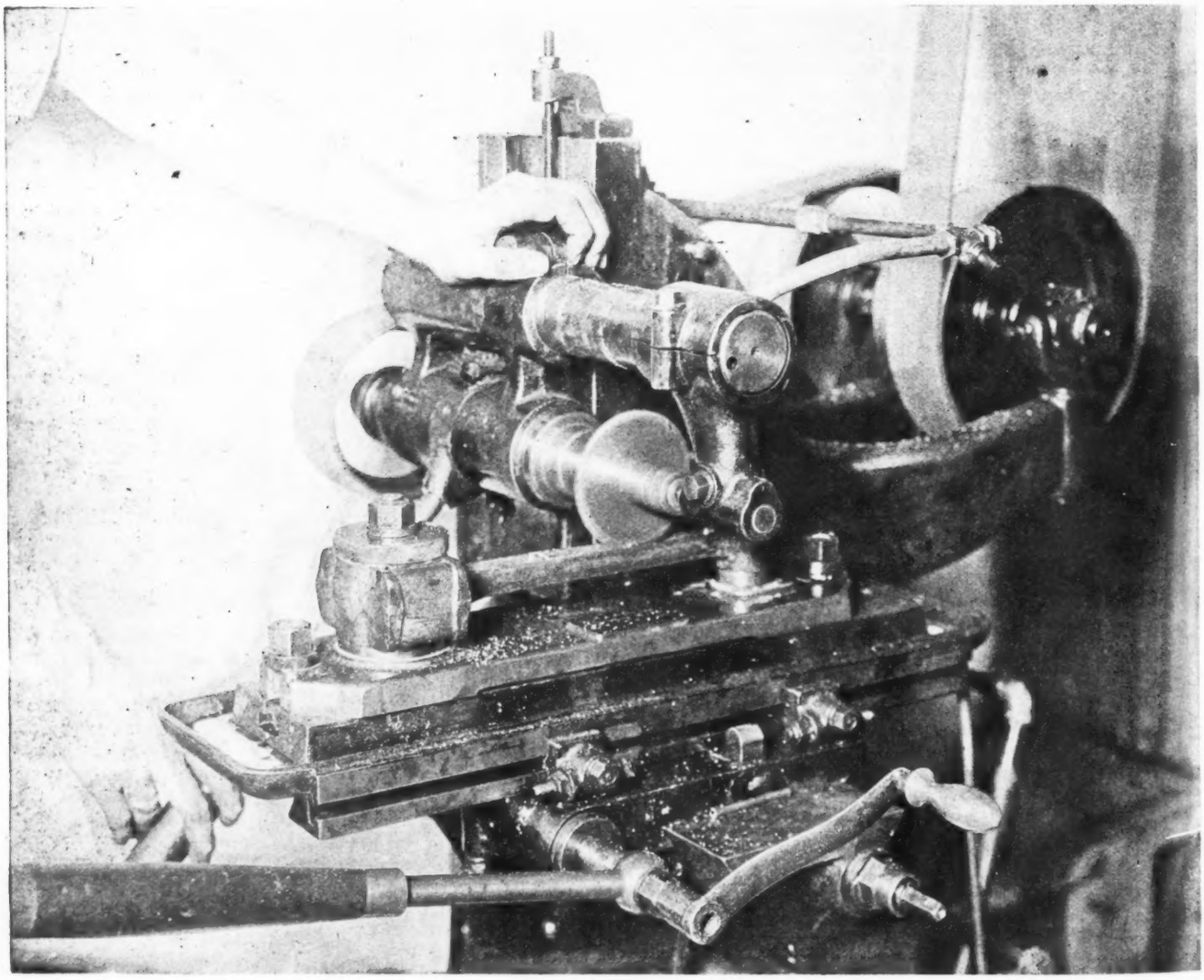
A final test is made to see that no twist has been put on the rod during manufacture and this test is ingeniously done on a special jig designed in the Hinkley tool room. It is shown in photograph No. 6, and, as shown, there is a big surface plate which is square with the jig and another surface plate which is square with the center of the piston pin hole.

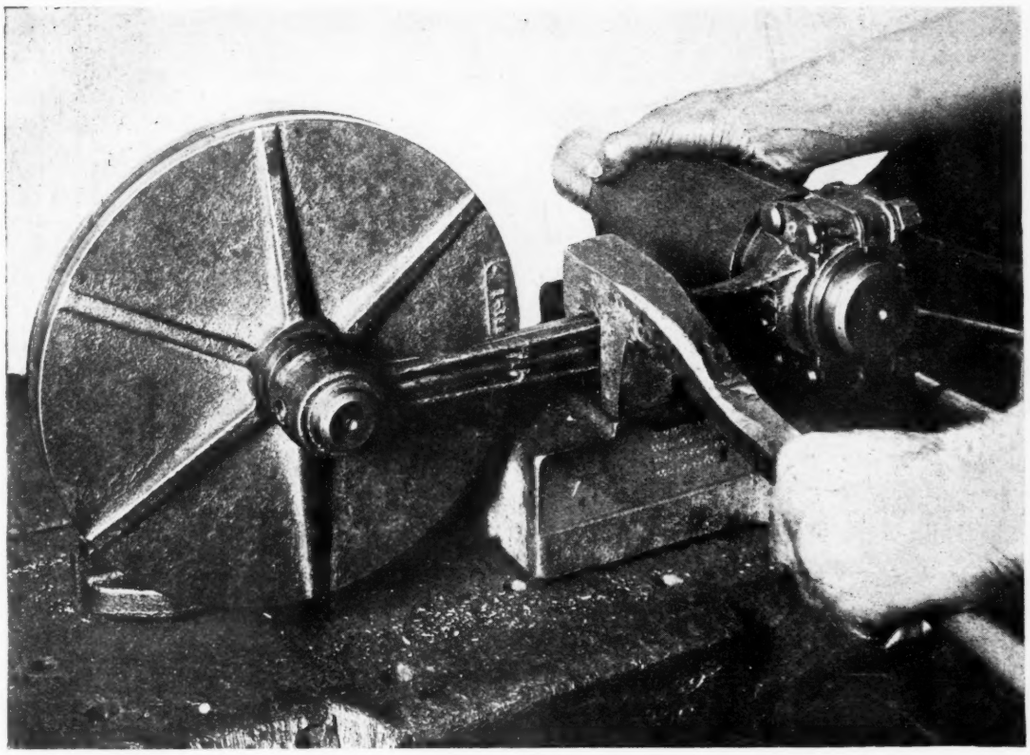
These two surface plates must come together accurately to show that the rod has developed no twists or bends, and since they are circular in shape, any gap between the surface plate indicates at once just why the rod is out of alignment. With this test made and a thorough set of inspections completed on special gages and jigs for the purpose, the rod is ready for the assembly department.

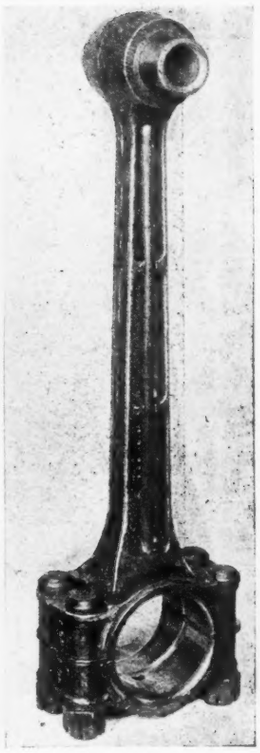


To the left—11—Milling connecting-rod cap nuts and sawing off bolt landing surfaces for heads and caps

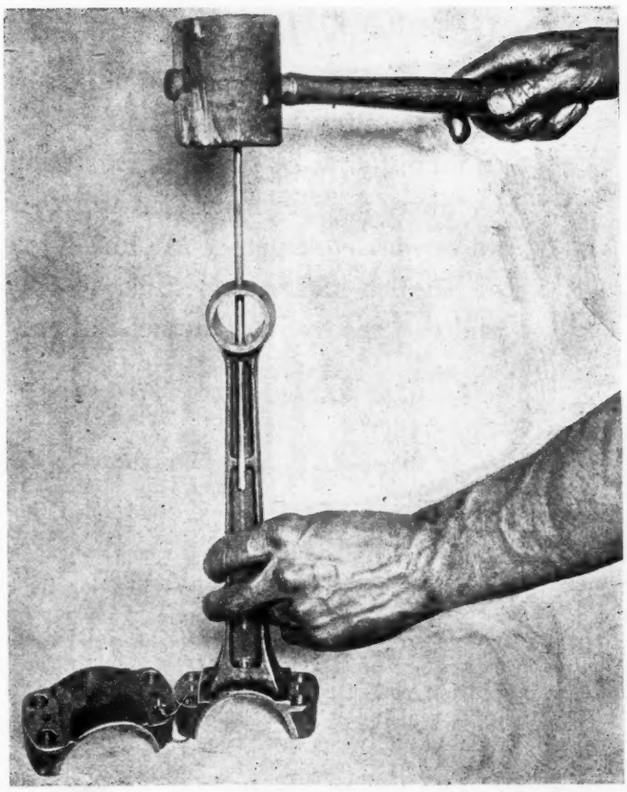
Below—12—Hand miller for sawing slots in connecting-rod webs for holding oil tube







Above—13—Final test for twists and bends, one surface disk being square with the gage fixture and the other disk being square with the hole in the small end of the rod



Above to the right—14—Photograph of finished connecting-rod with oil tube in place

To the right—15—Driving well tube into position through upper or small end of rod. The tube is then flared over to give flush surface

Grand Palais, which will house the first European post-war motor show

Space Rentals for Paris Show Exceed Records

More than seven and one-half acres of exhibition stands have been assigned to manufacturers for the first European post-war motor show, which opens October 9. The American representation includes fifteen manufacturers, and every continental car builder will be there and a fair representation of English makers. Because of fuel scarcity, the show will close at 6 P.M. and the decorative scheme, rather than lighting effect, will be the feature.

PARIS, Sept. 4.

EUROPE will initiate its series of automobile shows, interrupted by the war, by the inauguration, on the morning of Thursday, Oct. 9, of the Paris Salon. The opening ceremony will be performed by President Poincaré, assisted by the leading members of the French Government.

This will be the first purely automobile exhibition held in Europe for six years, and the first time that European makers have placed on view their wares produced with all the valuable experience of war behind them. On this account the exhibition possesses extraordinary interest, for it will be the first real indication of what European firms are capable of doing and what their commercial programs will be.

France is favored in having available for her annual motor show the most handsome, and one of the largest halls in the world. The million dollar Grand Palais was built for the Paris Fair of 1900, is owned by the Government, and is loaned to the show committee at a nominal fee. Built on the banks of the Seine, by the side of the Avenue des Champs Elysées, it possesses the advantage, in addition to its wonderful architectural beauty, of being located in the heart of the most artistic section of Paris.

The date of the show, Oct. 9 to 19, is earlier than usual. The arrangement by which it comes first is an international one. Next year London will have the priority. Because of the early date, the report has been persistently spread that manufacturers would not be ready and that the date of opening would have to be postponed. This is false. The show cannot be postponed, and although manufacturers are at present rather backward in their preparations, practically all of them will have new models ready for this exhibition.

The early date of the show has caused changes to be made in the attractions. In the past the Paris Salon has

been famous for its electric light effects, the show never looking its best until the lights had been switched on. This year there will be no more electric light than is actually necessary for utility purposes, for coal is costly and scarce in France. Further, with the closing hour fixed at 6 p. m., and summertime still in force, it will be broad daylight when the doors are closed.

In consequence, it has been decided to use the money previously expended on lighting on artistic decorations of the hall. An elaborate and effective scheme has been drawn up by some of the best French artists. The stands will be uniform and will be delivered to exhibitors completely fitted in every respect.

This year's show is open to touring cars, trucks, bodies, motorcycles, stationary engines and all kinds of motor accessories. At one time it had been thought that a special hall would be built for the trucks. This idea, however, has been abandoned, the trucks being put in the same hall as the passenger cars, assigned to smaller and less prominent stands. It is to be expected that the show will be of minor importance from a truck standpoint, but of the greatest interest as a touring car exhibition.

The decision has also been made to put on exhibition one sample of every type of motor vehicle used in the war. In order not to encroach on the space of trade exhibitors, a special hall is being erected in the gardens adjoining the Grand Palais for this military exhibition. This section, which is under the control of the Ministry of War, will contain staff cars, motorcycles, ambulances, searchlight cars, armored cars, tanks, automobile gun carriages, special trailers, and numerous army vehicles, the existence of which is hardly known to the general public.

Henri Cezanne, manager of show

Every Corner Taken

Applications for space exceed all previous records. More than 800 individual stands have been rented, and it has only been possible to get in all applicants by considerably reducing the maximum size of stands and by making use of every available corner in the big hall. The total space rented is 325,000 sq. ft., roughly equivalent to 7½ acres. It is believed that there is no other building in the world where so much space is available under a single roof.

The Paris Salon is open to all but late enemy subjects. Every automobile manufacturing concern in France, Italy, Switzerland and Spain has taken space. English manufacturers have never been enthusiastic over the Paris exhibition, preferring to hold their models for the London event a month later. English exhibitors are not likely to exceed forty, of which the following eight are car or truck makers:

Austin,	Sunbeam,
Daimler,	Vickers,
Leyland,	Wolseley
Foden,	Cubitt.

More Americans There

American participation is the biggest on record, which is rather surprising in view of the fact that American firms are given the least consideration in the matter of positions. Notwithstanding this, United States manufacturers have been remarkably fortunate in the drawing of lots for positions, for, while shut out of the big central stands, they have obtained what may be termed the cream of the second rank positions.

Apart from American accessory makers, who exhibit direct or through dealers, the following American firms will be present with car exhibits:

Cadillac,	Oldsmobile,
Overland,	Oakland,
Buick,	Case,
Chevrolet,	Allen,
Hupmobile,	Paige,
Maxwell,	G.M.C.
Mitchell,	Pierce-Arrow.
Scripps-Booth,	

It will be noticed that Ford is absent. Although selling in France more cars than any two other American firms, the Ford representatives declare they have no need for the Paris Salon. The same attitude has been adopted by Rolls-Royce. This firm, according to one of the show officials, objected to the high price of the stands. Rolls-Royce, like Ford, is a big seller in France, and has maintained expensive showrooms in the Champs Elysées throughout the war, although no private sales have been made during that time. American tire firms at the Paris Salon are Goodrich, Goodyear and U. S.

Stand rentals have been increased this year in order to meet the higher cost of organization. As an indication of the increased cost of equipping the show, the ordinary quality carpet used for the aisles costs $2.80 a yard, compared with 38 cents before the war. The rental of the biggest and best stands in the hall is $9,120 for the duration of the show. These stands have been secured by:

Peugeot,	F.I.A.T.,
Bellanger,	Renault,
De Dion Bouton,	Berliet.
Delahaye,	

The Paris Salon remains open eleven days—from Oct. 9 to 19, inclusive. Price of admission is 40 cents on ordinary days, 20 cents on Sundays, and $1 on Fridays. These prices are an increase of nearly 50 per cent.

Six Associations Interested

The show is managed by a committee of six French trade associations, and stand positions are awarded by the drawing of lots in which French and foreigners are on an equal footing, providing the latter have taken part in three previous shows. There is an exception this year with regard to Americans, who are not allowed to draw until after the others have selected their space.

The profits arising from the exhibition are returned to the six trade associations, who refund them to their members. The general manager of the Paris show is Henri Cezanne, who is also general secretary of the leading French automobile manufacturers' association and of the International Union of Automobile Manufacturers. Cezanne, who has been responsible for the past four shows, will retire after having cleaned up the accounts of the coming exhibition. It is understood that he will enter the automobile business, but his exact projects have not been announced.

During his period of management, Cezanne has not only made the Paris Salons very popular trade exhibitions, but he has succeeded in putting them on a sound financial basis, with a very substantial return to the exhibitors.

Testing Airplane Wing Ribs for Strength

There is much more to this article than the testing of one article. It is, in fact, a treatise of the completeness with which tests can be made and of the extent to which apparatus can be made for testing. It is a story of scientific pioneering work.

By Armin Elmendorf*

STRUCTURAL members such as the ribs of an airplane wing may be designed with approximate correctness either by applying the laws of mechanics to the component parts of the rib and in this way determining the size of each part, or by patterning the design after that of a similar structure known to give satisfactory results. In neither case is the strength of the rib known with any great exactness. Consequently, tests are necessary to furnish dependable data. Inasmuch as considerable reliance must be placed on these strength tests, it is imperative that the tests themselves should simulate the load conditions to which the wing rib is subjected in service.

In the wing rib development work done at the U. S. Forest Products Laboratory, Madison, Wis., tests are usually made first upon a given commercial rib or upon a rib whose design has been recommended. Weaknesses are located as the test progresses. After failure of the rib has taken place, other ribs are designed and built, incorporating features intended to strengthen the rib at the weak points. It has often been found possible to double the strength of the commercial ribs without increasing the weight. In some cases the weight has been materially reduced, and, at the same time, an increase in the strength has been effected.

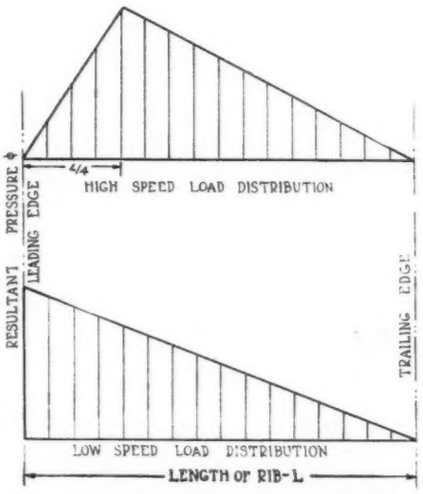


Fig. 1—Low distribution diagrams: Represent approximate sum of positive pressure on lower wing surface and negative pressure on upper wing surface

Load Distribution

The distribution of the air pressure on an airplane wing during flight depends upon a number of factors, particularly upon the angle of attack, the speed, and the aerofoil used; so that the results obtained in the strength tests for one load distribution may not check those for another load distribution. The two triangular load distributions shown in Fig. 1 were used in many of the tests made at the laboratory. In these diagrams each ordinate represents (very roughly) the sum of the pressures on the lower and upper surfaces of the wing, the latter being negative and somewhat larger than the former.

Inasmuch as it is not as feasible experimentally to apply the suction forces to the upper cap strip as it is to transfer all the forces to the lower cap strip, the latter method of applying the forces upon the wing rib was used. The pressure-distribution diagrams are first divided into a number of areas of equal width, and concentrated loads proportional to the areas are applied to the lower cap strip.

The lever systems shown in Figs. 2 and 3 were used for this purpose. For wing ribs shorter than 70 in., only eight loads were applied, while for greater lengths sixteen load points were used. The lever system makes possible any distribution of forces desired, for it is only necessary to change the length of the various arms by drilling new holes in the beams to obtain a different distribution. Any number of levers may be used in this loading system.

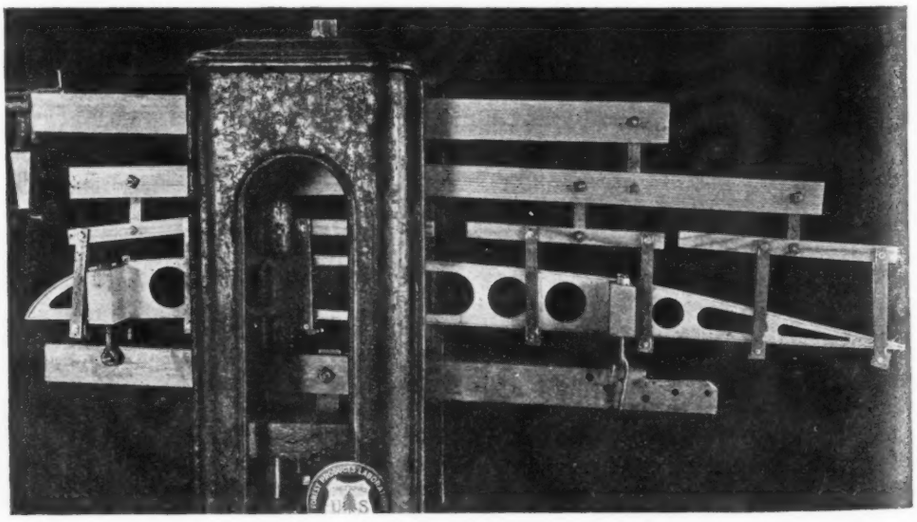


Fig. 2—Method of testing ribs up to 70 in. in length

*Engineer in Forest Products Laboratory, U. S. Forest Service, Madison, Wis.

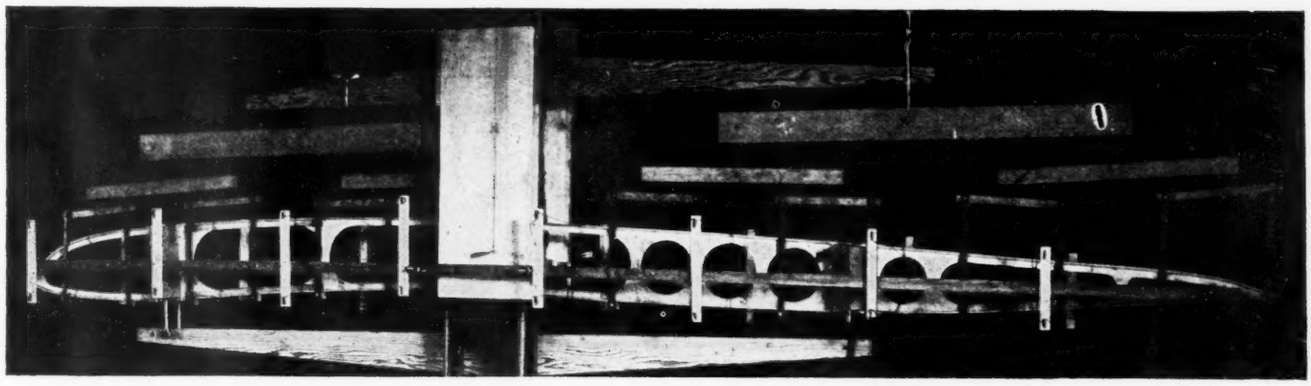


Fig. 3—Method of testing 15 ft. wing ribs

Requirements of Apparatus for Testing Wing Ribs

Speed Control.—The strength of wood, as determined by test, depends very largely upon the rate at which the load is applied. Since wing ribs are almost universally made of wood in some form, it is important, when making tests for comparative purposes, that all ribs be tested at the same speed. It is, therefore, desirable that the apparatus used in the tests be of such a design as to permit speed control.

Application of Loading.—Uniform loading, or that applied at a constant rate, is desirable. If the loads are applied in increments of, say, 10 or 20-lb. sand bags or their equivalent, the stresses induced in the rib when placing the bag upon the platform provided for that purpose may be much greater than those induced by static pressure exerted by the sand bag, especially when the bag is carelessly dropped upon the platform. An ordinary universal testing machine is used at the Forest Products Laboratory for applying the load, and it satisfactorily meets the requirements for both speed and uniformity of loading.

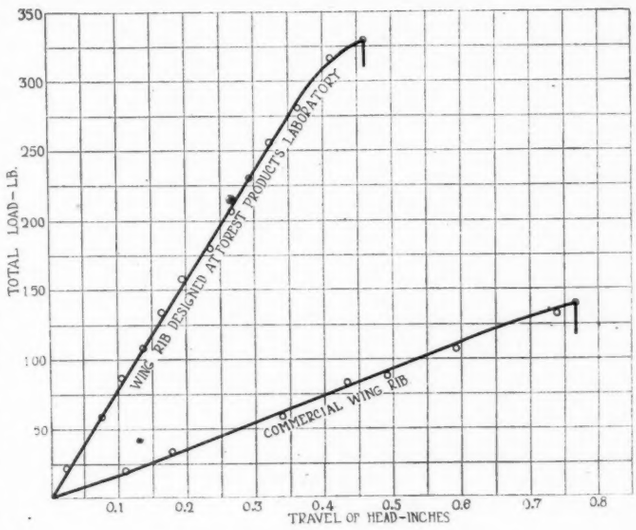


Fig. 4—Load-deformation curves

Accuracy.—The minimum load increment should not be too large a percentage of the total load. In loading with sand bags, for instance, the weight of the individual bags should not be too high. The universal testing machine used at the Laboratory for wing rib tests is calibrated to read to one pound, which is only a fraction of one per cent of the total load supported by most ribs.

Number of Load Points.—The larger the number of the small concentrated loads, the more nearly is distributed loading approached. However, a large number of points complicates the testing, so that for short ribs a lever system comprising only eight points was used. Most tests on wing ribs are made for comparative purposes, so that the use of a different number of loading points on large and on small ribs is not of great importance.

Lateral Support.—The lateral strength of wing ribs in general is not high, because the rib receives lateral support from the covering. When tested individually, it is desirable that this support be simulated, or failure due to lateral swaying may follow. Such support is not found necessary in small ribs, but in ribs over 70 in. long it is provided at the Laboratory, as shown in Fig. 3, by tying the rib with a series of cords to props nailed to two parallel beams extending the full length of the rib.

Measuring Distortions.—Distortion of the wing rib is a measure of its stiffness. By measuring the distance through which the head of the testing machine has moved at each load, a curve between load and travel is obtained. The slope of such a curve is an indication of stiffness. In Fig. 4, for example, the wing rib designed at the Laboratory shows considerable improvement over the commercial rib it was designed to replace, since the slope of curve for the former rib is higher than that for the latter. The area under the load-travel curves up to the point of rupture measures work, and, consequently, is an indication of relative toughness.

Deformations along the wing rib are measured by means of a scale. The distances from a long straight edge under the rib up to the lower cap strip are measured and plotted as shown in Fig. 5. Such curves locate maximum distortions and also point out the sections where curvature is greatest and where therefore the flexural stresses are high.

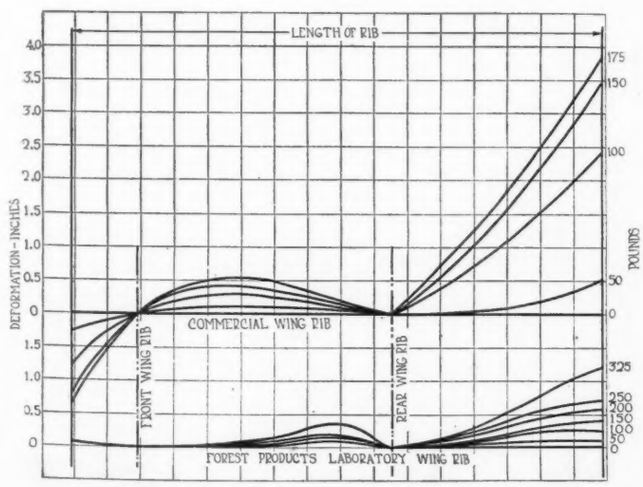


Fig. 5—Deformation of wing ribs: Vertical distances measure deformation relative to unloaded rib

A New Form of Lathe and Some of Its Products

Description of an unusual machine which simplifies the multi-tool operations in several ways.

THE Multi-Cut is a semi-automatic lathe on which one to ten facing and turning operations can be performed simultaneously, one operator running two machines. While the cut is in progress, the operator loads extra arbors or mandrels, the feed of the turning and facing slides being stopped automatically by means of trips at the end of their respective travels. Turning and facing cuts are completed simultaneously, the two slides being appropriately timed.

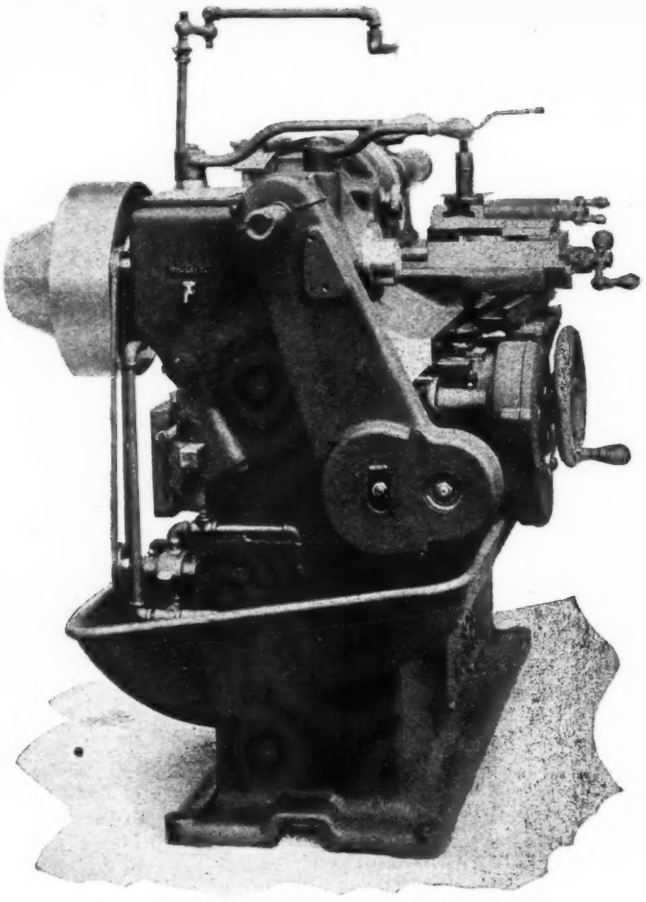
The work may be centered or held on arbors, or expansion or closer chucks, the latter either pneumatic or hand operated. On work that has been previously bored, reamed and rough-turned on the turret lathe or automatic, and remains to be finish-turned and faced, the Multi-Cut can be used to advantage. Gear blanks, bevel gears, pistons, steering knuckles, crankshafts, transmission shafts, electric starter details, etc., are rapidly turned and faced.

Several tools are in operation at once, but they are of the simple lathe type, and because of the small tool cost, the machine can be profitably used for relatively small lots. According to the manufacturers, the machine is easily and quickly set up, and heavy cuts can be taken with it.

While the new tool may properly be called a lathe, the manufacturers claim that it is sharply distinguished from the conventional lathe in its production capacities per unit of labor, floor space and investment. It is a specialized tool for manufacturing purposes.

The taper turning attachment consists of a rigid bracket bolted to the front of the bed, which carries an adjustable taper guide bar and a sliding shoe engaging the guide bar. The sliding shoe is attached to the cross slide, imparting to it an "in" and "out" movement with relation to the angular setting of the guide bar. The guide bar may be set straight to 4½ in. taper per foot, either side of the center, and clamped in the selected position by two heavy T slot bolts.

The plain facing attachment faces diameters up to the full swing of the lathe, at right angles to the turning centers. The feed of the facing slide is obtained entirely by the relative movements of flat and dovetail slides. A sliding shoe on the facing attachment slide engages the swivel guide bar which may be set at any angle within the range, imparting a vertical motion to the shoe, which is transmitted through a rack and hardened pinion to the cross slide. By changing the angularity of the swivel guide bar, the feed of the cross slide is varied or timed so that it will complete its work at the same time as the turning slide; it may be accelerated to finish ahead of the turning slide to permit of overlapping on forming and turning tools, or vice versa. The feed to both



Head end view showing right angle drive and pump drive and draw-off valve for oil in headstock

turning and facing slides is tripped by the same clutch, and will duplicate within close limits of accuracy.

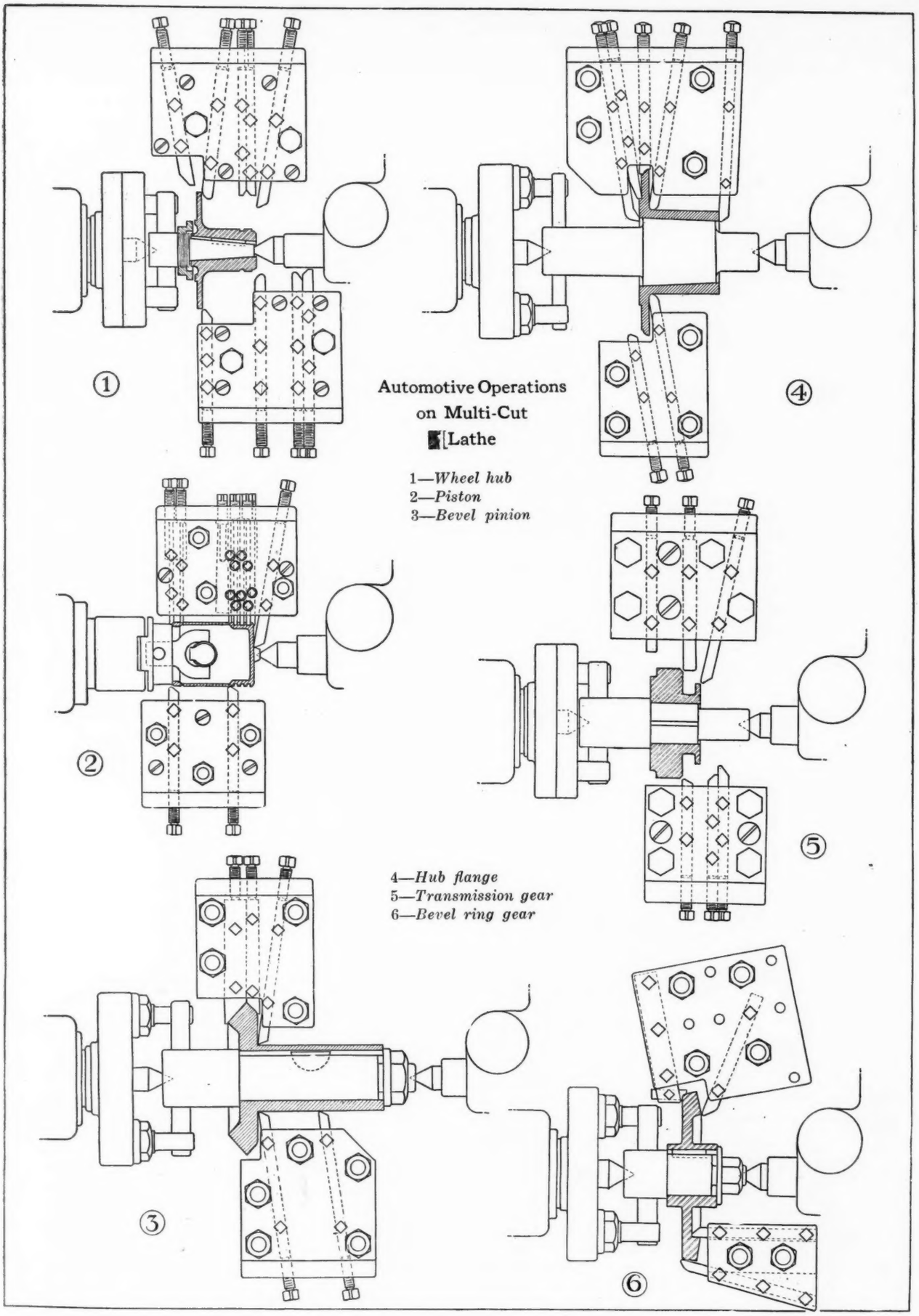
The standard tool block is arranged for multiple tools, and can be held parallel or at any angle, by reason of the spacing of the binder screws. The tool block is adjustable to the center of the lathe, and firmly clamped in position by two heavy bolts.

The universal facing attachment is adapted to angular facing operation on bevel gears, etc. When used in connection with a taper turning attachment the back and face angles can be turned simultaneously. The swivel block is graduated to facilitate angular settings and clamped in the selected position by bolts in a circular T slot. The feed is through a pair of hardened generator miter gears to the feed rack.

The Multi-Cut lathe is built in two sizes, the No. 6, with a 6 in. swing and 10 in. capacity between centers, and the No. 9, with 9 in. swing and 16 in. capacity between centers.

Owing to the varied classes of industries to which the Multi-Cut lathe is adapted, the equipment is made selective, enabling customers to select the combination best suited to their work. The No. 6 Multi-Cut is built with three types of headstocks, styles A, C and D; the No. 9 with four types, styles A, B, C and D. Either size can be furnished with screw or quick lever acting tailstock, plain or universal angular facing attachment, taper attachment, compound rest, draw-in or closer chuck and collets.

The style A headstock is a single speed, plain back-geared headstock with self oiling bronze bushings, ball thrust bearing spindle, and double helical or herring



Automotive Operations on Multi-Cut Lathe

1—*Wheel hub*
2—*Piston*
3—*Bevel pinion*
4—*Hub flange*
5—*Transmission gear*
6—*Bevel ring gear*

bone back gears. It is best adapted to work on cast iron or steel parts requiring fairly heavy reductions and no speed changes, for duplication work in quantities, and where the machines are placed in parallel lines in regular lathe departments and driven from a countershaft. The countershaft is provided with split pulleys to facilitate speed changes when required.

Style B head is 6 speed, selective geared and right angle driven. Three changes are obtained with one lever, a shifter knob compounding these changes through a back gear to 6 speeds. The gears are of 3½ per cent nickel chrome steel, heat treated and hardened. The headstock is oil tight, the gears and friction clutches running in a bath of oil. The spindle bearings and driving clutch are also continuously flooded with oil from this same supply. The main friction clutch is mounted in the driving pulley. The spindle is fitted with taper bronze boxes, babbitt lined, with convenient means of adjustment for wear. The thrust is taken on ball thrust bearings.

Style C headstock is a fixed speed set up head, for quantity duplicate production. The speed may be adjusted to suit conditions by means of a 3-speed change gear. A 4-1 back gear is incorporated in the drive, the changes being made by simple slip gears in the end of the head. The head is provided with a right angle drive, and is intended to be driven direct from the drive shaft.

Style D headstock is a single speed open belt head, provided with a lever-operated friction start, stop and brake. The driving pulley is accurately balanced, permitting of speeds up to 1000 r.p.m., adapting this headstock to work on brass, bronze, aluminum, and free cutting steels of medium diameters on which very high cutting speeds may be maintained. The friction clutch is mounted in the periphery of the driving pulley, and is of the double finger wedge acting type.

The variations in feed for turning and facing slides are obtained by loose change gears applied to the feed bracket and worm box. The feeds read in "thousandths per revolution of spindle," and a simple work diagram is sent with the machine to show the change gear combinations and resulting feeds.

The feeds of the front slide are fixed by the change gears used, while the feeds of the facing slide may be further varied with relation to the feed of the turning slide by the angularity given the swivel guide bar. It is sometimes desirable to accelerate or decelerate the feed of the facing slide, as it approaches the center, and this is accomplished by replacing the swivel guide bar with a former bar and roller designed to suit a specific job.

The feed worm and wheel are of fixed centers and enclosed oil tight. The feeds are tripped to a line by a sensitive acting positive jaw clutch, engaging a similar clutch mounted on the worm wheel. The feed drive is then through changeable gears and a pinion and bull wheel to the rack of the carriage. The drive to the facing slide is through similar change gears through the bed to the feed rack on the facing attachment slide on which the swivel guide bar is mounted.

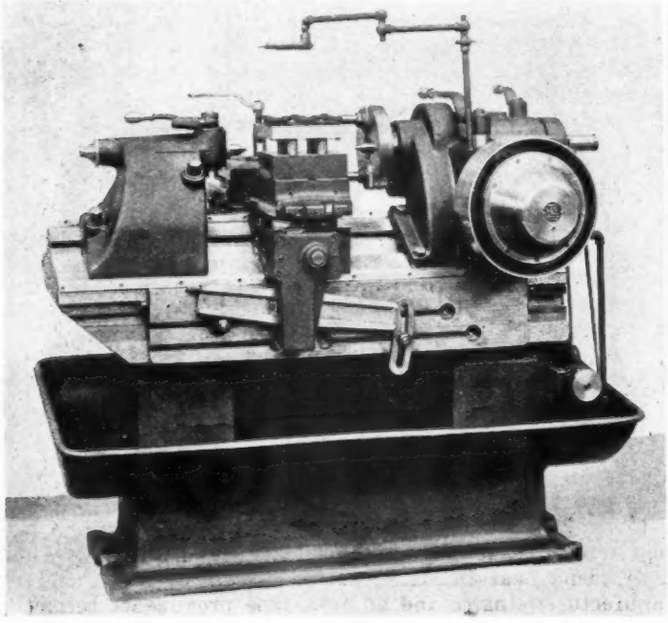
The feed rack for both carriage and facing attachment is placed in the center of the slides. The hand-wheel at the front of the worm box furnishes means of quickly returning the turning and facing slides to the starting position after the completion of each cut. The worm wheel and clutch run in oil, and the thrust of the worm is taken against ball thrust bearings. The gears subject to the greatest strains are of nickel steel, heat treated and hardened.

A plain block rest mounted on the cross slide is regularly furnished, equipped with a single screw tool post and an adjustable positive cross stop, but a compound rest can be supplied if required. The swivel is graduated in degrees for angular turning or taper boring.

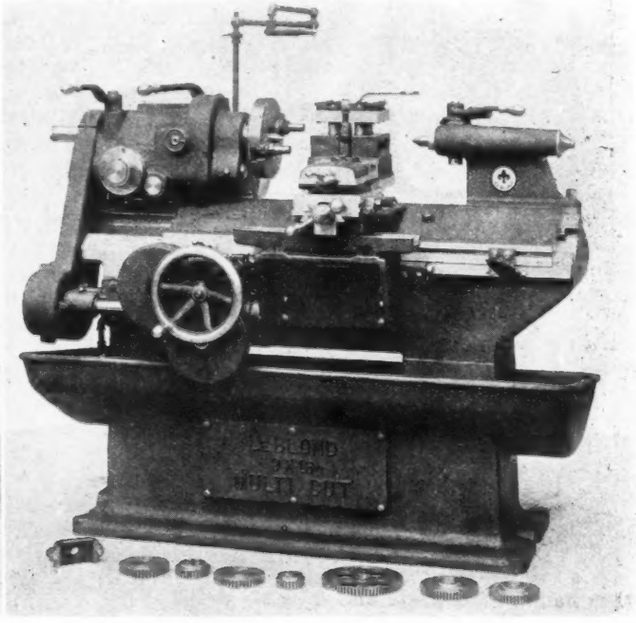
A quick acting lever tailstock is provided to permit of the quick removal and replacing of work with a single movement. The center is brought into contact with the work at any desired pressure, by a conveniently placed lever, further movement of which rigidly locks the tailstock barrel and clamps the spindle.

Styles B and C headstocks may be motor-driven, the motor being attached to a plate hinged from the cabinet base of the machine and provided with an adjustable jack for maintaining the desired belt tension. A constant speed motor (preferably 1200 r.p.m.) is recommended, 3 hp. for the No. 6 and 5 hp. for the No. 9.

The Multi-Cut lathe is manufactured by the R. K. Le Blond Machine Tool Co.



Rear view of No. 9 multi-cut lathe



No. 9 multi-cut lathe with style B headstock

Building Export Trade Catalogs

This plain statement of the necessary factors in the make-up of a catalog for foreign countries will find a welcome in many sales departments where the catalog is a troublesome ghost. We have in this country come to look upon a catalog as something between a work of art and a display of personality. Mr. Leggett, who has given this question much study, considers the foreign service catalog differently. Export articles previously printed in AUTOMOTIVE INDUSTRIES have shown the need of an adequate catalog.

By W. F. Leggett*

FEW manufacturers realize the importance of complete and accurate catalog information for foreign buyers, and usually fail to visualize the thousands of miles separating the potential buyers and their own factory. Some manufacturers consider that they are doing an export business when they fill the orders which fall in their lap—the origin of which constitutes a seven days' wonder in the local organization. My experience as director of catalog activities of large organizations has been full of such humorous incidents.

There is a broad export field open for American manufacturers who will conform to certain recognized catalog standards—easy to follow—and who will make the egg-cup fit the egg and not the egg fit the egg-cup.

> Webster defines a catalog as "a list of separate items, with added particulars, disposed in a certain order." But a catalog is more than this—it is one of the few avenues of direct sales open to a manufacturer.

Foreign buyers are not fond of too much text in catalogs—a fact that must be absorbed by the American manufacturers. There is a marked difference in the functions of sales promotion literature and the more modest catalog. The mission of sales promotion literature is to herald the manufacturer's product, to explain utility, to emphasize the advantages which will accrue from the purchase of the advertised article, to generate the inquiry which precedes the actual order, and to induce valuable good will.

Must Have Individuality

Sales promotion literature must be individual with each manufacturer, for a piano can hardly be treated in the same manner as a soda cracker. It should be designed to please the eye and invite attention. When properly designed it has its place in commercial literature, but it should not be expected to perform the mission of a catalog, lacking, as it does, the complete data which a catalog is expected to furnish. Sales promotion literature lays down a machine-gun barrage in the attack for business, while the more permanent catalog furnishes the heavy artillery.

Some manufacturers look upon catalogs as a necessary business ghost to be resurrected only when the last book of a preceding edition has wormed its way out of the works. Therefore most catalogs are carelessly edited, and are entrusted to the doubtful diligence of a junior salesman who may not be overworked at odd moments, or to another employee who has acquired an office reputation for dexterous handling of paste and shears.

This haphazard origin of the catalog is entirely disproportionate to its true value, for when it is used by a prospective customer it means that he is already convinced of the merits and utility of a device, and is now interested in manufacturing details and costs, and is not interested in a lot of flowery language which does not tell him anything definite. This makes the catalog a silent salesman always on the job, and its dress, talk and appearance should be as carefully watched as those of the living salesman.

It is possible to so standardize catalog listings that thousands of prospective purchasers will be trained to unconsciously absorb important data by being able to find similar information in the same place in every catalog.

The Necessities

This brings us to the physical make-up and text of an ideal catalog:

> (1) Its shape should be based on the hypothenuse oblong that will always have the same relative dimensions, width for length, if the pages be doubled or halved.
>
> (2) It should be an economical page size that will cut out of standard sheets of stock paper without waste.
>
> (3) The type measure should retain hypothenuse oblong dimensions, and be large enough to permit of two-column arrangement to each page, leaving appropriate uniform outer margins.
>
> (4) The press size should be such that at least 16 pages—and better still 32 pages—may be printed at one impression.
>
> (5) The binding size should be such as can be folded and stitched on any standard folding machine.
>
> (6) The trimmed catalog should be of a size which can be filed in any standard letter cabinet.

There are several sizes of catalogs which conform to this definition, but careful examination of the merits of each leads to recommending 8½ x 11 as offering the best average advantages when the variety of text is considered.

The text of the average catalog suggests "57 varieties" of layout, style, description and illustration, each reflecting the caprice of its author. Catalog facts should be compiled according to a predetermined plan, uniformly presented, accurately, but briefly described, well illustrated, and very systematically coded and numbered. The cover page should bear the title, sub-title, year of issue, and manufacturer's name and address, type prominence being given to the margin title. No illustrations should mar the cover page.

*Catalog Director of the Manufacturers' Publicity Bureau, Inc., and recently Catalog Director of Western Electric Co.

The first text page can be used for a sketch of business history or for sales promotion data. Each of the following pages should be self contained in pairs—the left hand page carrying a short description of the article listed, its utility and application, with an illustration of the product underneath the text, and the right hand page carrying complete data such as code words, list numbers, dimensions, weights, list prices (boxed and free) relation to other items of the same class, variation from other types, improvement over previous types and other comparative data.

Illustrations

Each page should be checked with reference to its relation to other listed items. Illustrations should harmonize in size and screen with all others in the catalog and should be uniform in proportion. Captions under illustrations should consist of only one line of type. Divisions in text should start with bold face type of the same style as the text, or with small capital caption. Price columns should specify "each," "per 100," "per 1000," "per foot," "per dozen," or "per pound." Factors of length should bear their signs, factors of weight, their abbreviation, and factors of quantity should appear in digits rather than letters.

It would distinctly add to the usefulness of a catalog if factors of weight and length were translated in metric equivalents for Latin distribution—this is helpful but not essential.

Points of delivery should appear on each price page. If goods are delivered free at destination, or some freight equalization offered, it should be stated over the list price. If delivered F. A. S. it should read "Price each, boxed, F. A. S., New York"—or other shipping point.

Page One Stuff

Such items as terms, discounts, credit policies, return of goods, etc., should be treated on first page and when necessary reference should be made to that page.

Each page should be self-contained and cross reference to other pages should be avoided except when absolutely necessary. When employed, cross references should be very carefully checked for necessity and correction. Particular care should be given to the system of code words used, and recognition must be made of language characteristics. There are certain well-defined rules governing the construction of words for code purposes which can remove the possibility of error in sending and decoding, and which will immediately identify the item ordered. Word construction deals with concrete application and should not be applied carelessly.

Alleged refinements, such as multi-color, thumb cut-outs, a few pages on different color paper stock, and other varieties, are inadvisable, and may create annoying precedents.

A dignified, black and white, export catalog, carefully edited, containing complete and accurate data and of a standard size, gets the best results.

Automotive Research Proposed by the Bureau of Standards

A RECENT statement issued by the U. S. Bureau of Standards outlines the following program:

Kerosene Carbureters, Fuel Savers and Gasoline Improvers—Laboratory examinations and dynamometer tests of (1) devices now on the market for the utilization of kerosene and poor gasolines, (2) fuel savers, and (3) gasoline improvers. This work will be very largely a continuation of that for the Inventions Sections of the Army and the Naval Consulting Board. The results will, however, be made immediately available to the automobile industry at large and should be very valuable in solving the problem of adapting the engines now in use to the changing character of the fuels available. The nature of this problem will make it necessary to investigate the difficulties encountered in the operation of engines with kerosene, and interesting results are to be expected.

Lubrication—The investigation started for the War Department has made equipment and personnel available for the solution of many of the perplexing problems of lubrication confronting the automobile industry. Such are the dilution of crankcase oil, the physical and chemical properties of oils suitable for use in automobile engines, the possibility of the regeneration of used oils, etc. It is hoped to obtain valuable information on these questions.

Automobile and Truck Performance—The Motor Transport Corps has shown great interest in the automobile dynamometer now being constructed at the Bureau. It is felt that there is a great need for more information on the power losses incurred in the present designs of automobiles and motor trucks. The knowledge gained through work with a car dynamometer will attack the fuel shortage problem from the car design standpoint.

Carbureter Design—The design of carbureters is dependent upon knowledge of the requirements of engines for economical fuel utilization. The apparatus and methods for the study of these requirements are available at the Bureau of Standards, and in view of the importance of fuel economy, it is felt that they should be made available to the whole automobile industry as soon as possible. The apparatus designed for the testing of airplane carbureters is being made available to manufacturers for the study of the performance of their product.

Combustion of Hydrocarbon Fuels at High Pressure—There is a need for a knowledge of the fundamental chemical and physical phenomena occurring in the combustion of hydrocarbon fuels. This work should be of great value in overcoming the difficulties encountered in the operation of engines on kerosene and heavier fuels. The chemical and physical laboratory equipment is available for this work. In this connection a method has been developed for the measurement of the rate of flame propagation in an engine in operation and also a high speed indicator has been designed, which gives great promise of success.

Solid and Pneumatic Tires—There has been designed and constructed a tire testing dynamometer, and by utilizing this equipment in connection with the car dynamometer, it is hoped to obtain very valuable information as to tire design and construction. An investigation has been planned to the effect of accelerators and compounded ingredients upon the physical properties of rubber and its rate of deterioration. It is hoped to discover a satisfactory accelerated aging test which will indicate the probable life of the sample under ordinary conditions of use. Investigations are also being carried on with a view to the improvement of the present methods for reclaiming rubber.

AN Italian metallurgist, C. Rossi, of Legano, claims to have produced an acid-proof iron alloy by melting pig iron and ferro-silicon in an electric furnace with a small amount of iron sulphide as flux. The alloy contains from 13 to 21 per cent of silicon.

Scale Effects in Relation to Aerodynamics

In this discussion of the testing of airplane parts in wind tunnels, Prof. Levy brings out many points that will be of interest not only to engineers interested in new air science, but to engineers who are interested in mathematical development. Prof. Levy is in charge of wind tunnel investigations for the National Physical Laboratory of Great Britain and is author of some of the best technical books on aviation and a leader in the development of the scientific aviation.

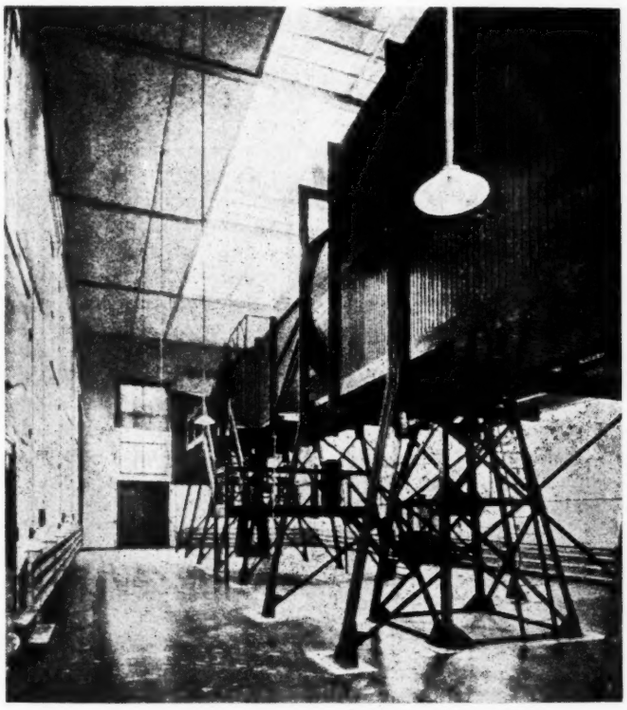
By H. Levy, M.A., D.Sc., F.R.S.E.

IN all branches of engineering design the question of scale effect is one of vital consequence. With almost the sole exception of those cases where the mathematical theory of elastic structures has enabled us to design the full-sized construction from a direct calculation of the forces and stresses that will be brought to play upon it, experimental investigations on models are the only means to hand for supplying the data upon which the full-scale design is to be based. Before such an investigation can be considered admissible, however, the basis of prediction from the model to the full scale must be laid secure.

In no branch of engineering is this question of more vital consequence than in the new science of aeronautics. Full-scale experimental work in this subject, invaluable as it has been, particularly during the recent war, can never in the nature of things undertake the fine and delicate tests on all the numerous details and refinements that mean so much in the design and construction of a machine in which every inch of improvement is worth fighting for.

Full-scale scientific investigations on airplanes in actual flight suffer from the two inherent disabilities which in all first-class research one seeks to eliminate—(a) the temperamental defects of the pilot and (b) inadequate knowledge and utter lack of control over the atmospheric conditions.

If it be realized that an up-current of as little as 1 per cent may involve an error in the drag measurement of the wings of as much as 15 per cent, it becomes at once evident that only by an immense series of checking and rechecking by numerous test flights could full-scale research under actual flying conditions serve alone as a basis for design. Experimental means, moreover, for direct measurement of the forces brought into play during flight are not likely for some considerable time to be so far developed as to allow of a determination of the isolated effects of the small variations in design which together in the end sum up to considerable importance. The advantage that experiments on models in the wind tunnels possess over those on the full scale and in the open becomes at once apparent. Complete control can be exercised over the experimental conditions both as regards wind speed and the isolation of the effects on resistance and consequently on performance due to slight modifications in design. But these advantages are only to be had at —in many cases—the expense of facing an extremely serious difficulty — viz., the problem of scale, and it is with this aspect of the question that the present article is primarily concerned.



The No. 2 7-ft. channel: General arrangement

The construction by means of which the forces on the models are measured is shown in Fig. 1. It consists essentially of two rectangular horizontal wooden tunnels connected by a slightly tapered portion containing the propeller. When the latter is in operation the air is sucked in through the inlet and along the front or working portion of the channel. At the inlet mouth is situated a honeycomb to steady the flow and distribute the air uniformly along the channel.

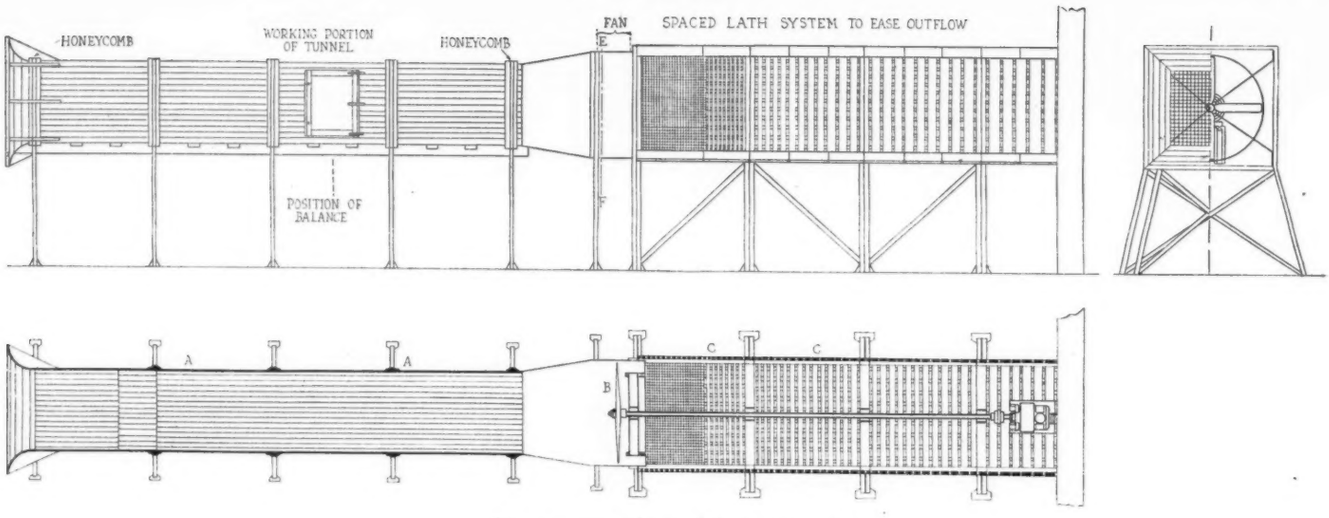


Fig. 1—The No. 1 4-foot channel

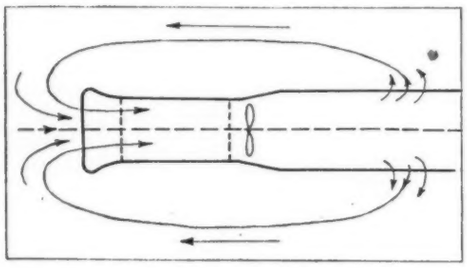
Almost midway along the working portion, where the distribution in velocity across the section is most uniform, is placed the model fixed to a vertical support through the floor of the channel, forming a portion of the balance by means of which the forces and moments exerted on the model are measured. The air then passes through a second honeycomb, through the propeller and is discharged into the outflow distributor. The walls of the latter are composed of vertical laths spaced progressively to allow as far as possible of the passage of the slip stream air back into the room without the production of excessive turbulence by splashing against the wall.

Looked at in plan, the flow of the air in the room is as indicated in Fig. 2, and by such a symmetrical system the streaming in the tunnel proper can be maintained at a high degree of steadiness and uniformity. It is not until a distance of 1 in. from the wall is reached that any appreciable drop in the velocity is found. The wind speed in the channel is regulated by adjusting the revolutionary speed of the propeller in the usual fashion. In utilizing the wind tunnel for aerodynamic research two different classes of measurement are essential: First, the accurate measurement of wind speed, and, secondly, the measurement of the forces brought into play. The instrument upon which the measurement of wind speed depends is known as the Pitot tube. The general outline is shown in Fig. 3. It is composed of two hollow tubes fitting one inside the other and closed along the circular edge *AB*. The outer tube is perforated at the points *CDE*—and open again to the outside at *F*. The inner tube is open both at the front *AB* and at the end *G*. The fore part *LM* is placed parallel to the wind *V* whose speed it is required to measure. A tube of this nature moved on the end of a whirling arm is found by experiment to acquire in the inner tube, in addition to the ordinary static pressure p_o, an additional dynamic head given by $(\frac{1}{2})\rho v^2$, where ρ is the density of the air in gravity units and v is the speed. This total pressure $p_o + (\frac{1}{2})\rho v^2$ is usually transmitted to one end of a pressure gage. At the perforations *CDE*, etc., where the stream is parallel to the surface, there is no additional dynamic head, and the pressure at the outlet *F* is therefore p_o, the general atmospheric pressure. This is transmitted to the other arm of the pressure gage and balanced against the pressure $p_o + (\frac{1}{2})\rho v^2$. The weight of the column of liquid between the two levels in the gage is consequently $(p_o + [\frac{1}{2}]\rho v^2) - p_o = (\frac{1}{2})\rho v^2$, and from a measurement of this difference in level the velocity can easily be calculated.

A diagram showing the form of the pressure gage is given in Fig. 4. The difference of pressure between the two cups *A* and *B* shows itself by a rising or falling of the meniscus *M*. This may be compensated for by a measured number of turns of the screw wheel *W* which alters the relative level of the cups. The alteration of level read off from the scale *S* is thus a measure of the difference in pressure between the two cups.

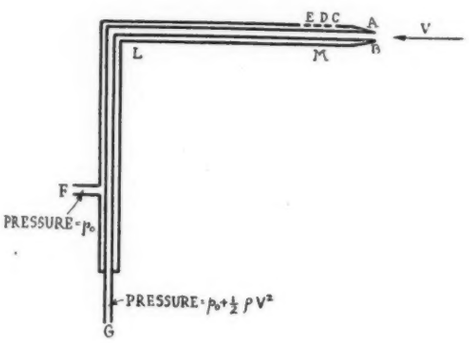
A detailed description of the balance in use in most aerodynamical laboratories for the measurement of wind forces on models will not be entered into here, but for the present it is sufficient to state that the principle on which it is based is to balance the moments due to the component wind forces—drag along the direction of the wind, cross-wind force perpendicular to that direction in the horizontal plane, and lift in the vertical plane—by applied external moments. With a model whose weight does not exceed 3 lb. the balance is sensitive to 0.0001 lb. and to much less for very light models.

It is clear that by means of these highly delicate ap-



Left—Fig. 2—Diagram showing flow of air in room.

Right—Fig. 3—Diagram of Pitot tube in air speed meter



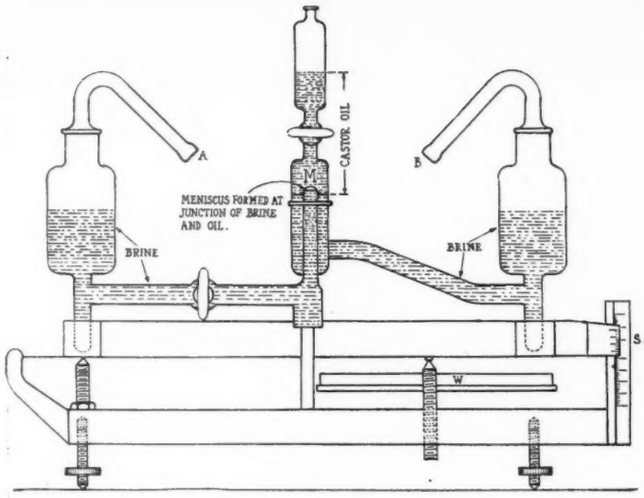


Fig. 4—Air pressure gage

pliances the aerodynamic properties of bodies of all possible shapes, and the modifications due to slight changes, may be investigated to a great degree of precision, but it is also clear that unless the laws of prediction of the forces operating on full-sized machines or parts, at the high speeds of flight occurring in practice, from those measured on models at wind tunnel speeds, are equally precise much of this work would be futile. Even were the laws of transition not known, however, there is still the possibility of deriving useful information by mere comparative methods.

As to Changes

For example, if it be found that a particular modification—it may be a change in wing section, a change in cross-section of strut, etc.—involves an improvement in the design of the model indicating itself in a more efficient performance, there is a presumption that the same modification will involve an increased efficiency on the complete full-scale machine. How to estimate this increased efficiency in magnitude in the latter case from that measured on the model is, however, a question of much more vital consequence, for upon it will depend ultimately our power of designing aircraft for specific functions and placing reliance on the results. It will be seen that an answer to this can be provided—complete for all practical purposes—by nothing more than an application of the classical dynamical laws of Newton.

In order to clear the ground, certain experimental facts bearing on the question may be briefly recalled. If two bodies of identical shape but one twice the other in size be tested for air resistance in a wind tunnel, it is found that the resistances are equal if the larger model is tested at half the wind speed of the other. Generally, in fact, if the shape of a body be given by a drawing and the length of one part be represented by l which determines the size of the body, then if v be the wind speed, so long as $v \times l$ is maintained constant, the resistance remains constant.

This suggests immediately that in air the wind forces exerted on a body are purely a function of the product $v \times l$. We may arrive at this result, however, from very general considerations without reference to experiment. The forces operating on a body can only depend on the size l of the body, its shape, the density ρ and viscosity ν of the air, and its wind speed v. In effect this implies that the expression for the resistance must contain these quantities and these quantities only. We have at the same time the general principle in dynamics that the dimensions of such an expression must be those of a force since it is equated to a force. How then are the quantities l, ρ, ν and v to be grouped together to give an expression having the dimensions of a force? As a mathematical problem this is quite simple and indicates that the resistance R must be represented in the form

$$R = \rho v^2 l^2 f\frac{vl}{\nu}$$

It is particularly to be noted that the exact form of the function $f(vl/\nu)$ is so far indeterminate and will depend purely on the shape of the body under consideration. Two bodies of the same shape but of different sizes moving at different speeds will have the same *form* of expression for f, but vl/ν will have distinct values for each case. As long as the two bodies are moving in air, ρ the density and ν the viscosity will remain fixed, and it follows at once from this formula that if $v \times l$ is maintained constant the resistance will be the same in both cases in accordance with the experimental fact already referred to. The accuracy of this formula has been subjected to many searching tests, not (be it noted) to check whether the dynamical laws upon which it is based are valid, but to determine whether or not it is justifiable to assume that in all cases the forces depend only on the quantities stated.

Working Out Formula

The formula suggests that for all such aerodynamical investigations the most suitable manner of presentation is to plot the resistance coefficient $R/\rho v^2 l^2$ against vl/ν. The curve thus obtained should represent the form of the function f, and all points derived from experiments on bodies of the same shape should, irrespective of the size of the latter, fall on this curve.

The equation

$$\text{resistance coefficient} = R/\rho v^2 l^2 = f(vl/\nu)$$

states that as long as the experiments to be compared are conducted in air, and this is evidently satisfied by comparative aerodynamical tests in the wind tunnel, the force coefficient will depend only on the value of vl at which the experiment is conducted. It follows at once therefore that if experiment enables us to cover a wide enough range of this product the determination of the forces on the full scale could be derived by drawing up an experimental chart showing the variation in force coefficient with vl and selecting the ordinate at the appropriate full-scale value of this quantity.

Fig. 5 gives such a chart for the best strut so far obtained. In this case the resistance coefficient is represented as the resistance coefficient per foot run of the strut, the standard dimension l used in the foregoing discussion, selected in this case to represent the shorter diameter of the cross-section. If in an actual strut l = 6 in. = ½ ft. and v = 120 ft.-sec.

$$vl = 60.\ \text{ft.}^2\ \text{sec. units}$$

and the curve indicates that the resistance coefficient for this value of v = 0.04.

A point of extremely general significance is illustrated by Fig. 5. The resistance coefficient, of very large magnitude for low values of vl, falls rapidly, and for large values of vl ultimately approaches a constant value, but when the resistance coefficient is constant the resisting force is proportional to the square of the velocity, and this therefore is the law for a strut moving with comparatively high speed. But this result is not peculiar to a strut; for practically all bodies of aerodynamic shape it is found that if the resistance be measured up to high enough valves of $v \times l$ this force tends ultimately to become proportional to the square of the velocity, and this is prob-

ably the case for bodies of the magnitude of those occurring in a full-sized airplane flying at its normal speed. It follows at once that if the wind tunnel tests can be continued up to such a value of $v \times l$ as render the resistance coefficient sensibly constant, the constant of proportionality is at once determined and the magnitude of the forces on the full scale can immediately be estimated.

Unfortunately, however, for the complete success of this method, the disparity between the values of $v \times l$ for the model and for the full scale is extremely great and it is frequently necessary to extrapolate over an extremely large range of $v \times l$. The relative extent of this extrapolation becomes clear from a simple calculation. If the chord of an airplane wing is 6 ft. and its wind velocity 100 ft.-sec. the corresponding value of $v \times l$ is 600 ft.²sec. units, while for a model test on a wing the chord is rarely greater than 6 in. at a wind speed of 60 ft.-sec., giving a value for $v \times l$ of 30. An extrapolation of, from 30 to 600, appears an extremely large range with a probably high degree of inaccuracy, but in practice the error thus occasioned is more apparent than real. In most cases that arise either the curve for the resistance coefficient has become sensibly constant before the limit of the experimental range is reached, or it is rapidly becoming so.

It is at this stage that full-scale experimental investigations on machines under flying conditions play an important part in acting as a check and supplying correction or confirmation to the model results. Systematic and continuous comparison has now been carried through for several years and the conclusions have been arrived at, that no very serious errors creep in as a result of these extrapolations, provided certain factors are used with discretion.

A Warning

One evident source of trouble is possible, however, and must be guarded against. It has been shown that the resistance coefficient depends entirely on the value of $v \times l$ at which the experiment is conducted; but a wider point of view than this can legitimately be adopted. All the phenomena of the motion, the nature of the flow and stream lines, the occurrence and period of the eddies will all likewise depend on this value. Now it is found experimentally that certain critical values of $v \times l$ exist for any given body, in the region of which the nature of the flow undergoes rapid change, accompanied by a simultaneous rapid alteration in the value of the forces originated. It has, for example, been found that certain struts at a given wind speed may indicate as many as three different values for the head resistance according, apparently, to the nature of the flow of air in its neighborhood. The value of $v \times l$ at which this occurs is clearly extremely critical. The three separate resistance curves thus indicated would not be equally stable, and at much higher values of $v \times l$ two of them would disappear. If a false extrapolated value is not to be obtained, it is evident that the experimental range of $v \times l$ in any given case must extend well beyond any region in which such critical values may arise.

There is one branch of aeronautical engineering in which the difficulty as regards scale effect does not arise to any measurable extent, that of propeller design. In this case there is an extra complication in the question which did not enter in that of the steady motion of a body—viz., the fact that the propeller is rotating at a definite angular velocity, say n rev. per sec. in addition to its forward motion. If D is the diameter of the propeller, then, following the lines indicated earlier in the article as regards the form which the forces must take, in this case the thrust and torque, it can be rapidly shown

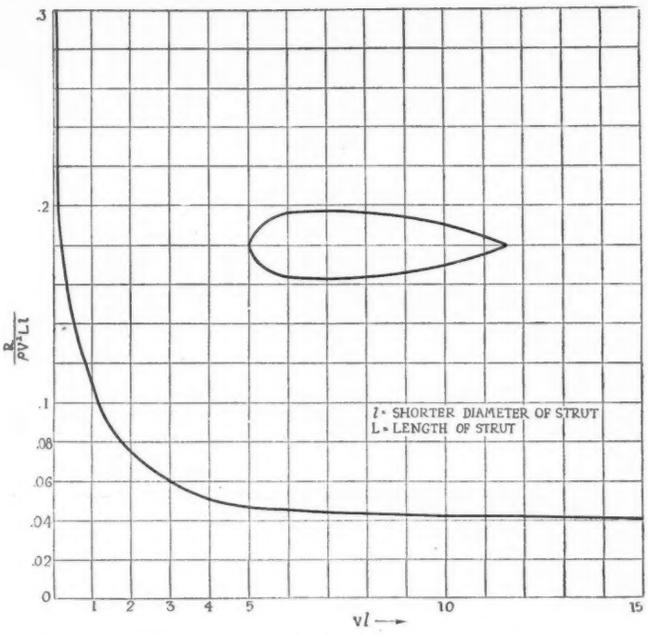


Fig. 5—Resistance coefficient chart for airplane strut

that these quantities must depend on the quantity V/Dn in addition to VD/ν as before. Ample evidence, however, exists to indicate that in general the effect of the viscosity term is negligible. This would be so if on plotting the thrust coefficient on a base V/Dn the points corresponding to different values of VD/ν all fell on one single curve instead of a series of such curves. That some form of scale effect might arise is evident on general considerations from the fact that each elemental section of a propeller blade may be considered as of the nature of an aerofoil each portion of which as already seen would produce its own scale effect. Whether these sum up to any appreciable magnitude is quite another matter. Taking a propeller of 6-ft. radius with a mean chord for the aerofoil section 3 ft. from the boss as 5 in., rotating at a speed of 1200 r.p.m., for a static propeller of this nature the value of $v \times l$ would be approximately 160, which is normally well beyond the range at which any scale effect shows itself appreciably. On general grounds, therefore, it is not to be anticipated that the term VD/ν will enter into the equation at all, and this conclusion has been borne out in so many actual cases that have been tested that it may be considered of general application.

Scale Corrections

It may therefore be accepted that in order to investigate the properties of propellers, results obtained on models need not be corrected for scale effect, so that the force coefficients, efficiency and other general properties of the propeller will depend merely on the value of V/Dn at which the test is made and experimental means for a model can always be devised to cover the complete range of this quantity required in practice.

Non-Dimensional Coefficients

In the foregoing discussion reference has been made in each of the classes of problem dealt with to certain groups of terms by studying the variation of which all the properties concerned may be treated. Such a quantity in the case of problems of the motion of viscous fluids, of the forces on struts, wires and airplane wings is Vl/ν, and in the case of a propeller V/Dn. For every physical problem, whether concerned with aeronautics or not, some

such groups of symbols exists with the variation of which, as it were, all the properties may be considered. Now, if we consider the dimensions of these groups of symbols, what do we find?

Quantity	Symbol	Dimension
Speed	V	L/T
Length	l or D	L
Viscosity	ν	L^2/T
Angular speed	n	$1/T$

The dimensions of Vl/ν and of V/Dn are evidently from this table zero, and it follows at once that the value of both these quantities will be absolutely independent of the system of units in which it is expressed, provided all the quantities concerned are expressed in a consistent set of units. An illustration of the same idea from another branch of engineering will be familiar to the reader. The buckling of a homogeneous untapered strut or column, by end thrust takes place when the latter reaches the value

$$F = \pi^2 EI/l^2$$

where E is the elastic constant for the material, l the length of the strut and I the moment of inertia; but this may be written

$$\frac{Fl^2}{EI} = \pi^2$$

and a consideration of the dimensions of the expression on the left-hand side shows that it is non-dimensional. No matter in terms of what units the various quantities are measured, provided they are self-consistent, buckling will always take place when this quantity becomes equal to π^2.

In the same way, if a series of struts, tapered or otherwise, all geometrically identical as regards outline but of different sizes, be tested for buckling as a class, they will all fail when Fl^2/EI reaches some definite fixed value, where EI is the flexural rigidity at some standard section along the length, say the mid-section.

The initial step, therefore, in analyzing any physical or engineering problem by experimental means is to determine the group or groups of non-dimensional terms by whose variation the properties may be studied. Any function of these non-dimensional quantities will itself be non-dimensional, of course, and consequently we have such expressions as

$$R/\rho v^2 l^2 = f(vl/\nu) = \text{non-dimensional quantity} = k, \text{ say.}$$

$$T/\rho n^2 D^4 = F(V/Dn) = \text{non-dimensional quantity} = T_c, \text{ say.}$$

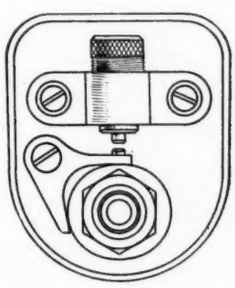
The quantities T_c and k, etc., are non-dimensional coefficients from the value of which at any speed, translational or rotational, and for any size the various force components may be calculated.

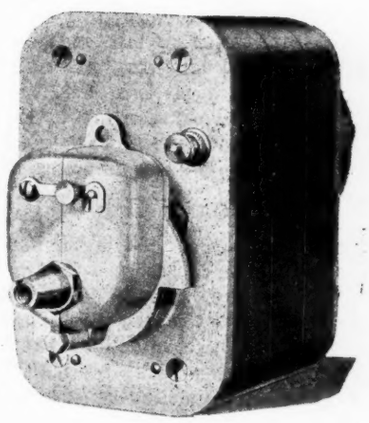
The analysis of all these problems centers round a consideration of the value adopted by these coefficients as vl/ν and V/Dn changes. Containing thus the essence of the problem from the theoretical aspect, they embody at the same time the simplest method of representation. The magnitude they adopt for any value of vl/ν or V/Dn is independent of the system of units used, whether in ft.-lb.-sec. or c.gs. units, while the forces required can be obtained directly by multiplying by $\rho v^2 l^2$ or $\rho n^2 D^4$ in the appropriate units.

A New Design of Inductor Type Magneto

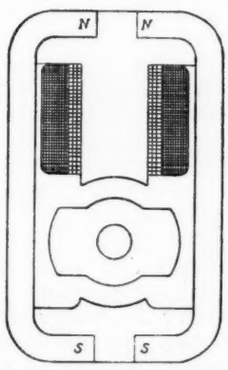
A NEW magneto of the inductor type, to be known as Rogers, is made in 2, 4, 6, 8, 12 and 16-cylinder models. The 2, 4, 6 and 8-cylinder models produce 2 sparks per revolution of the rotor shaft, while the 12-16-cylinder type gives 4 sparks every revolution. A special magneto made for the 12-cylinder Liberty aircraft engine gives 12 sparks per revolution of the rotor, and produces 2 sparks simultaneously in each cylinder. Two-spark magnetos are also made for other 12-16-cylinder engines, and produce 8 sparks per revolution.

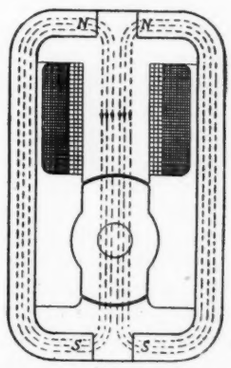
The general layout of the magnetic circuit can be seen from the sketches, this being very similar to that of a certain type of electric generator having one salient and one consequent pole, the place of the field winding in the generator being taken by the primary and secondary armature windings in the magneto. When the poles of the rotor are opposite the field poles the magnetic circuit is closed, and when the rotor is at right angles to this position the magnetic circuit is open. An increased volume of spark, as compared with other magnetos, is claimed, which is said to be due to the double magnetic circuit, and resulting in increased magnetic area. The condenser is said to be puncture-proof, and the interrupter points free from liability to pitting. The interrupter is operated by a double lobe cam on the end of the rotor shaft. This cam acts on a bell crank carrying one of the contact points, while the other contact point is yieldingly supported upon the interrupter base. The interrupter is located at the driving end, and the distributor at the opposite end of the magneto. The Vita Mfg. Co. is putting this magneto in production.





Above—Interrupter. On right—Interrupter end of Rogers magneto





Magnetic circuit of magneto, open and closed

What the Employer MUST Do in Present Labor Situation

Mr. Tipper, this week, brings out strongly the fact that the day of the big stick in labor dealings has passed and the employer who will get on with his helpers must talk over certain things with them. To do this he must have an understanding of certain things and this understanding must be the application of his estimate of the individual to the workers as a body. It is Mr. Tipper's idea that the deep roots of the situation have not been changed by the war but that labor has merely gained power to do things that have long been in mind.

By Harry Tipper

THE superficial character of the study of the factors involved in the present labor unrest is indicated in discussions which are constantly taking place at meetings of manufacturers' bodies, civic organizations, sociological organizations, and other bodies who are concerned with the general welfare or productive capacity of the country.

It is remarkable that the people who are thoroughly acquainted with the ideas, opinions and incentives which actuate William Smith or Tom Jones after acquaintance, begin to imagine that the incentives, opinions and ideals which govern the collective bodies are entirely different.

The private conversation which the manufacturer will indulge in on the subject of the situation of some of his employees cannot be reconciled with the statements he will make when he discusses the impersonal and abstract subject of labor and capital.

The sociologist brings to his discussion of social conditions the workmanlike accuracy of the dissecting instrument, with which it is possible to separate the parts but which possesses in itself no diagnosis as to the reasons and no judgment upon the remedies.

There is a persistent refusal, in the general thought upon the subject, to lay aside the old traditions which have been accepted as fundamental economic necessities or laws, and very little tendency to investigate these or question their accuracy, although the symptoms, which have been developing for the past twenty years, would suggest to the thinking man the necessity for a more complete understanding of the factors out of which these symptoms arise.

One or two of the most authoritative among the manufacturers of this country in the past few weeks have made public statements with regard to the labor question, which classed together the bolshevik, socialist, the I. W. W., and the federated union, although these organizations have very little in common and although some of them are engaged in a more bitter political warfare than anything contained in the present national political situation.

The relative strength as between the radical labor union members and the more conservative crafts members is something which should interest the manufacturer very thoroughly at the present time. In at least fifty strikes which have occurred during this year, the strikes have been the direct outcome of internal politics in labor ranks, and they have not been directed at the manufacturer so much as they have been directed at the opposition within the labor organizations.

It is not infrequently the case that a manufacturer is caught in the jam, where there is a political fight within the organizations of labor, and is a victim of the ferocity of that fight.

Recent discussions with a good many manufacturers indicate that they are not alive, even now, to the fact that they must bargain collectively with labor; that they must submit their ideas of management to labor to some extent; and that the only choice which lies before them is, whether they will take up each issue as it arises with the increasing power of the labor unions and the increasing bitterness of labor union politics, or whether they will lay the foundation for plans in their own organization by which they can take these matters up with their own employees and bargain collectively with these employees in connection with their wages, their hours, and their working conditions.

A number of public speakers, since the armistice, have stated that the world since the war is a new world. It is not a new world, for the symptoms of unrest which are present to-day are only different in degree from the symptoms of unrest which were present in industrial development of every country twenty years ago. **The difference lies in the fact that the power has been transferred.** The symptoms of labor dissatisfaction with conditions in the industrial system are very old, and they have been increasing in volume, in character, and in insistence very rapidly for twenty-five years, so that every manufacturer has had plenty of warning, plenty of time to investigate, and plenty of opportunity to understand.

During those years, however, the labor organizations were not sufficiently powerful to re-enforce their demands with threats, to turn their threats into action. The war made that condition. It took out of labor a great many men of the various countries engaged in the war, it reduced the surviving man power to some extent, it increased the productive capacity, and it left the world with a largely increased productive necessity. This meant that for the first time in many years the productive demands are too large to be taken care of by the present effort at production.

Furthermore, during the war and in two or three years just previous to the war, the organization of labor had

grown very materially. It had become more articulate and its demands more definite.

Labor opinion, however, does not represent that unity of idea which is commonly accredited to it by manufacturers and other observers. Labor politics has always been somewhat keen and labor opinion divided as to the advisability of any definite line of action.

This division has grown sharper since the war gave such an impetus to the revolutionary socialistic ideas, and since the propaganda among the foreign races in the United States has been thoroughly organized in this respect.

The revolutionary socialistic organizations, such as the I. W. W. and the bolshevik organizations, have never enjoyed so wide a following as they have to-day in the United States; they are organized more thoroughly than at any other time, and they have larger funds at their disposal for the furtherance of their purposes.

The division between revolutionary socialistic ideas in labor circles and the idea of the occupation unions has become much keener, and the best efforts of the leaders of the unions federated with the American Federation of Labor have been exerted to combat the growth in radicalism, and to discredit and discountenance the radical leaders.

It is the knowledge of this situation and the bitterness of this fight which caused Frank Morrison, secretary of the American Federation, to state before the Senate Committee that we were "living on the edge of a volcano." It is that which has caused other federated leaders to deprecate the tendency to class all opinions voiced by labor leaders as authoritative opinions for the general labor body. It is that difference which has caused the split in some cities among the textile workers, which has interfered with the orderly progress of events in the machinists' unions, which has precipitated strikes in the printing trades, and which has extended and delayed settlement in the building construction field.

It is not only that the strength of the union's factory labor has increased so tremendously and that the opinion is becoming sharply defined, industrially and politically, but the unrest which found its expression in the demands of skilled and unskilled factory labor has permeated the ranks of all employees to some extent.

Conversation with professional men, engineers, lawyers, accountants, with office workers, and with salaried employees of various kinds, reveals a tendency to question the justice of the present condition and a tendency to sympathize with the objects of the labor union, which indicates that public opinion is not stable outside of the labor union ranks; and that among other classes of population, which are termed the "middle classes," there is a strong leavening of radical opinion which is finding expression in some form or another and which will after a while have its effect upon their action in the political situation.

It should be apparent to the manufacturer, after what has happened since the armistice, that the opinions of the workers of all kinds are far more important, in connection with the efficiency and cost of production, than he has been ready to give them credit for. It should be apparent to him that no intelligent understanding of the labor situation can be secured without a study of these ideas and opinions, not only in respect of their demands but in respect of the whole question of economic production and distribution.

It should be apparent that the demands of the labor unions and the thoughts of other people in connection with industry are extending themselves so that they will force into the political arena many questions which have been confined to private negotiation between employers and employees up to the present, and this should indicate to him the necessity for a thorough understanding of the individual opinions and collective opinions of his own employees in respect to their work, their unions, his organization, and the present conditions under which they have to work.

In this respect a good deal of importance may be attached to the International Labor Conference which is called to meet in Washington next month. It was obvious, when the labor conference, a sub-division of the peace council, had completed its reports that the workers of these various countries had agreed practically upon eight or nine fundamental conditions which were to be internationally operative, and were to be recommended back to the various governments for suitable regulation so as to make them operative. It is to be expected that the forthcoming conference will further clarify and crystallize these ideas, so that they will be put before the public of the United States as the net results of discussions of the most important body of labor opinion which has ever met in any country.

These results will be transmitted to labor unions and will be discussed in labor unions all over the United States, and they will be read and discussed by workers who have no connection with labor unions, and they will be considered very carefully by professional men, and salaried workers who are by no means satisfied with the present condition of affairs. These conclusions will have a very considerable effect, therefore, upon the tendency of labor action and upon the demand which the politicians will make on their constituents as to governmental action.

There is a general agreement among manufacturers that something must be done to meet the case in which they find themselves, but, as time goes by, the number of industrial organizations who study the question and set out with some well ordered plan as a basis for its solution is a relatively small percentage of the total number of concerns who are effected by the situation and who will be obliged to give it consideration within the next few years.

There seems to be a great deal of inertia on the part of the leaders in industry, not only in respect of any experimentation but in regard to any investigation, study and analysis which goes into the human side of the case and which deals with the ebb and flow of human opinion.

When organizations have determined upon making experiments, that determination is arrived at, frequently, after a very superficial examination of the conditions, and there is an immediate demand for action—the wisdom of the action being apparently much less important than action of some kind.

Both these tendencies arise from the same thing, and that is, the presumption that the old traditions on this subject are correct and that a superficial examination of present development is therefore all that is necessary in order to determine the means which should be taken to meet it.

The matter is not quite so simple as that.

In Great Britain where the homogeneity of the people and the long organization of labor unions have crystallized the issues very much more thoroughly, the attempts to get together have failed so far to produce any decent results; no leaders have arisen who seem to be capable of handling the situation. In the meantime, production lags until it is almost at a standstill. The governmental doles continue as the financial situation becomes worse; the worker's suspicions are in-

creased by lack of attention to his demands and the lack of any real indication of action upon them. The whole situation is somewhat discouraging for those who believe that the matter is simply one of bargaining strength and can be settled by a determined attitude.

In this country the housing situation has not eliminated strikes in the building construction field; strikes continue in other lines; the radical opinion in the labor ranks continues to gain sufficient advantage to force the situation; the manufacturer finds himself in a position where the workers are not increasing their productive efficiency and his cost per unit depends upon such uncertain factors, that he is unable to figure it more than a few weeks or months ahead.

Until the individual manufacturer, or the executive in charge of production, will take upon themselves the study of this question with the energy which they have displayed in the study of processes and equipment, with the same careful investigation, and with at least an equal measure of understanding, none of the bases for a solution can be applied very effectively.

It is useless to talk about educating the worker unless the executives themselves are educated to a knowledge of his point of view and position. It is not much use to erect organization machinery which will provide the worker with a share of responsibility in the government of his own conditions, unless the executives sufficiently understand his thoughts and habits of mind, so that they are able to deal correctly with and are understood by the worker.

It is not much use to suggest changes in industrial organization, which will result in the proper bases being determined, unless the industrial leaders have a sufficient background in their knowledge of human incentives and human necessities, labor suspicions, creeds and ideals to operate these things wisely and patiently, and work with them consistently so that they become thoroughly valuable.

The manufacturer cannot determine whether he shall bargain collectively with his workers or not. In most lines of industry he must bargain with his workers, either now or in the near future.

The question for him to decide is, whether he will bargain with labor unions or organized bodies which have neither responsibility or interest in the success of his organization; or, whether he will study the matter, endeavor to understand the situation and determine upon plans which will provide the machinery whereby he can impose some responsibility upon his workers, and bargain collectively with his own organization with the enlarged sense of responsibility they gain from the changes.

Calculation of Pressure in a Hydraulic Veneer Press

PLYWOOD is now largely used in fuselage construction for airplanes. Results of experiments at the Forest Products Laboratory, Madison, Wis., indicate that an excess or lack of pressure in gluing plywood tends to weaken the glue joint materially. This fact suggests the importance of knowing the amount of pressure per unit area which is being applied to any panel.

The pressure gage reading must vary with the size of the panels if the same amount of pressure per square inch is to be secured. For example, if the same gage pressure is applied on 10 by 36-in. and 36 by 40-in. panels, the pressure per square inch will be approximately four times as great in the first case as in the second.

The formula for the calculation of pressures may be written:

$$G = \frac{P \times A}{R} \quad (1) \text{ or } P = \frac{G \times R}{A} \quad (2)$$

where G = gage pressure in pounds per square inch
P = pressure on panels in pounds per square inch
R = area of piston or ram in square inches
A = area of panel in square inches

To illustrate the use of the formula, let the following case be assumed: On a hydraulic press with a 10-in. piston, what pressure gage reading is necessary to secure 75 lb. per square inch on panels 24 x 48 in.? Use formula as in (1),

$$G = \frac{P \times A}{R}$$

Here G = gage reading required
$P = 75$
$A = 24 \times 48$ or 1152 sq. in. (area of panel)
$R = 3.1416 \times 52$ or 78.54 sq. in. (area of piston)

Thus $G = \frac{75 \times 1152}{78.54}$ or 1100 lb., the required gage reading.

Suppose the operator of the press should use the same gage reading of 1100 lb. in pressing panels 8 by 36 in. What would be pressure on the panels in pounds per square inch? Here use formula as in (2),

$$P = \frac{G \times R}{A}$$

P = pressure actually secured on panel
$G = 1100$
$R = 78.54$
$A = 8 \times 36$ or 288

Then $P = \frac{1100 \times 78.54}{288}$, or 300 lb. per square inch, which is four times that used on the larger panels.

A table, showing gage readings to be used for all the sizes of panels manufactured and for the different pressures used, may be computed and placed near the press where the operator may see at a glance the gage reading required from each run of panels. It is advisable to check the accuracy of the pressure gage occasionally.

To determine the *exact* pressure secured, the weight of the platen to which the pressure is applied must be taken into consideration. For practical purposes, however, it may be omitted from the calculation, as inaccuracies in the gage reading, etc., may account for much larger errors. When included, the formula becomes:

$$G = \frac{P \times A}{R} \text{ plus or minus } \frac{W}{R} \quad (3)$$

or

$$P = \frac{G \times R}{A} \text{ minus or plus } \frac{W}{R} \quad (4)$$

Where W = weight of lower platen plus weight of panels or upper platen alone, as the case may be. The sign of the last member of equation (3) is plus when the pressure is applied by the lower platen, and minus when applied by the upper. In equation (4) the reverse is true.

AN alliance has been made between the Chemical Employers' Federation and the Motor Transport Employers' Federation.

Putting the Hood and Spare Wheel Out of Sight

Upper picture at the left shows how top folds into space in back of body. Lower picture shows the hat room provided by top of this design. Above — The wheel case under the back of body

THERE is one thing more unsightly than a folded top —and that is an unenclosed spare wheel. But the margin of virtue is small and the statement made is a doubtful compliment—both appendages are eyesores and spoil the graceful body lines of the modern automobile. Even when detachable covers are fitted to wheel and folded top, the improvement is only slight; they still remain obvious excrescences on an otherwise well-balanced whole.

In the standardized five-seated bodywork of the 20 hp. British Austin car special provision is made for both the folded top and for two spare wheels. A hood casing formed at each side and behind the rear seating is not a novelty, but it is believed to be so when arranged in conjunction with a wheel compartment below it.

Usually the hood casing, when it has been adopted, forms a distinct bulge around the top of the back panel, but in the Austin the panel sweeps down with only a gradual inward inclination; the space thus provided all round the seat is utilized at the back for a purpose to which it is well adapted—to form a compartment for the two spare wheels included in the equipment. The wheels are enclosed by a dished metal cover which has a lock at the bottom and a handhold near the top. The lock also serves for a tool box which is carried below the wheel compartment and is slung from the rear tubular cross member of the frame.

The casing for the folded top naturally carries the rear body panel further back, and as the top is fastened on this line it is possible for a lady to lean against the back of the seat without fear of endangering her, sometimes, extensive headgear; this point is illustrated in one of the accompanying views. It is needless to add that this feature is popular with women.

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Automotive Industries—The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly), July, 1907, and The Horseless Age (semi-monthly) May, 1918.

IN the next issue of AUTOMOTIVE INDUSTRIES we expect to print another of the articles descriptive of the German trucks. This one will concern the Transmission Groups and doubtless will be of much interest to American truck manufacturers. It is with pleasure that we can now see a definite prospect of printing an even more complete analysis of these trucks than was attempted in Col. Slade's articles. A definite announcement of the work in hand is made on page 607 of this issue.

THERE is so much bad news coming out of Mexico —reports of bandits, threatened revolutions and unfriendly attitude toward this country—that it is refreshing to hear good news once in a while.

A recent official report tells of the installation in the postal service of that country of fifty automobile trucks and a number of motorcycles. All of these vehicles are American made. The trucks are replacing the stage coach and mule trains that carried mails across the mountains and other places difficult to reach. The motorcycles are being used in a recently established special delivery service in the larger cities.

Bodies and Springs

THERE are two important parts of a passenger car which are likely to be the object of continued efforts to "improve"—the body and the suspension. Body design has to meet especially requirements of appearance, and this is very largely a matter of taste. Somebody has made the remark that matters of taste cannot be argued, but this does not seem right; in fact, it appears that they can be argued *ad libitum*, because they are not subject to proof.

After a certain style of body has been in use for some years the design becomes stale and old-fashioned. For a while smooth, flowing lines and graceful, harmonious curves have the call, eventually to be ousted by straight simple lines, while in between we may possibly get a "skilful combination of curves and straight lines." Each style of design is, of course, superior at its proper period, when the public mind has been molded to duly appreciate it.

There has been a very similar lack of stability in the field of spring design. European engineers started with the half-elliptic spring, but we thought that for our unusually poor roads the full elliptic was more suitable. Gradually, however, the demand for a low hung car forced the partial introduction of the half-elliptic, to be followed shortly by the three-quarter elliptic which at one time was extremely popular. Then came the cantilever spring for which very much was claimed, and just now the half elliptic seems to be gaining more rapidly than any other type.

There are, of course, several considerations that affect the choice of spring types, but the pre-eminent one is the passengers' comfort. This, unfortunately, is a rather intangible factor. It is not susceptible to accurate measurement or definite determination. Several persons may ride together in a new car and one may be enraptured by the smooth, gliding motion, and other features, while the rest may consider it a very ordinary ride. This is an instance where the personal equation comes into play. The enthusiasm engendered by such a ride is not solely dependent upon the curve described by the vehicle body as the car travels over the more or less uneven road surface but also upon the mental condition of the passenger.

Curves of spring action have been plotted by suitable mechanism, but they are, generally speaking, of little value. These curves consist usually of a series of sharp peaks, which is due to the fact that the scale of distances traveled, on the horizontal axis, has to be chosen very small. In reality the body describes a wave motion and the degree of comfort or discomfort the passenger feels depends in some way on the amplitude and the periodicity of the waves. It would undoubtedly be a safe statement that the smaller the amplitude and the lower the periodicity of the vibration the more comfortable the car. But what if one car shows a greater amplitude and a lower periodicity. We have then another case of adding up apples and pears, which can't be done. Consequently, it is difficult to disprove claims.

Aviation and International Relations

So far the quarrel over the Peace Treaty and the League of Nations does not appear to have extended to the Convention for the Control of International Aviation, which was drafted by representatives of the various nations represented at the Peace Conference. This convention was made a part of the Peace Treaty and when that Document is signed it will become an obligation on the part of all the nations to take part in this control.

Already in Europe there are questions arising of the rights and privileges of aviators who cross the national boundaries. The countries there are small, and the aviator who would make a good flight must travel in a small circle or go out of his country. The novelty of crossing the Atlantic has been accomplished and there is no reason to believe that this will not, in time, become more or less commonplace, either with airplanes or dirigibles.

When foreign fliers arrive in this country there will arise at once a score of questions that must be settled in keeping with the Peace Conference Convention or there will be situations that will be more or less embarrassing to all of the nations concerned.

There can be no question but that the war established the airplane in a position from which it cannot be removed, as an international factor and also as an industrial and commercial feature of all the larger nations of the world. We must accept aeronautics as a problem of great importance, so why not begin preparations for handling this problem?

The State Department is not equipped to handle this problem any more than it is equipped to handle the problems arising from military affairs. Always there is a special military attaché who takes up important military affairs with foreign nations and the War Department outlines the course to be pursued and weighs the importance of the proposals from other nations. The State Department does not, without the proper advice from the proper authorities, take up maritime problems of international importance. No more can this department take up aeronautical questions and settle them without the expert advice that would come from an Aeronautic Department.

America once was in position to become the dominant factor in aviation, but this opportunity was permitted to slip to European nations, which gave to the Wright brothers the aid they were unable to get in this country. A realization of our loss in this regard did not come home until the war began and we saw how far this country had been outstripped in aeronautics by European countries, one of which was aligned against us as an enemy. Then we poured millions of dollars into an effort to regain what we had permitted to slip from us.

We are not even with the rest of the world in aviation, but we have an opportunity of again taking up this work without serious handicap. But there must be some one designated to assume the responsibility and to plan for the future.

The National Government must speak before the 49 states get under way in making laws which will only serve to complicate the situation. It would be too much to expect any government to unravel an international dispute which concerned half a dozen foreign fliers who had become involved in tangles in half a dozen states, the laws of which were made without the slightest regard to the International Convention. America would soon become known as the country that foreign fliers must avoid and we would be isolated as far as air travel would be concerned.

Then, if another war came, more and more millions would be required to put this country in position to meet the other nations in the air. The situation appears to be one that suggests the old saying "An ounce of prevention is worth a pound of cure."

Praeger Sees Many Air Mail Changes

Postal Director To Arrange West Indies Service—Wants Separate Air Department

NEW YORK, Sept. 22—A solution of America's aviation problems, which center upon the adoption of a fixed national policy, is proposed by Otto Praeger, Second Assistant Postmaster General, who sailed recently from here for Cuba. During his absence he expects to make preliminary arrangements for a flying boat mail service between Florida and the West Indies.

The Cuban Government is anxious to see this communication brought about and Praeger is considering proposals from several private enterprises which are now operating between Key West and Havana. While here Praeger visited the plant of the L-W-F Engineering Co., where a number of mail planes are being built to carry 3000 lb. of cargo on non-stop runs between New York and Chicago.

"The Post Office Department, which has successfully established the aerial mail, does not feel it just to be excluded from any unified service which may be developed by the Congressional committees now considering the whole subject of aviation," Praeger said. "Two bills for a Department of Aeronautics are now before Congress. I am opposed to both of these as they stand, because they do not recognize what the Post Office Department has accomplished. We desire to co-ordinate our activities with those of military, naval and civil services. But we do not feel that the interests of the Post Office Department should be subordinated to the military or naval any more than the military or naval would feel that their interests should be subordinated to us.

Wants Department of Aeronautics

"Those interested in the development of aerial mail have, therefore, worked out a diagram of proposed Government co-ordination which we trust will be considered in connection with the plans now before the country. At the head of our Government, of course, stands the Chief Executive. Under him are the heads of the various departments, in the case of aeronautics such as the Secretaries of War, Navy, Post Office, and Commerce or Interior.

"If the Post Office Department is permitted to develop the work it has so successfully begun, I believe that a Department of Aeronautics should be created, headed by a director who shall develop, regulate and co-ordinate all our aerial activities but not undertake to operate the service of the army, navy or post office departments. I believe it wise to retain in the Navy Department, under the control of the Secretary, all strictly naval air activities. Likewise. I think it wise to keep all strictly military air activities under the control of the Secretary of War.

"The aerial mail is a new development for which the Postmaster General is rightly responsible. I believe it possible, under a co-ordinated system, to divide our affairs into two main branches, one of which would be personnel and the other the air mail contractors.

"It is absolutely necessary for the Post Office Department to operate the aerial mail. There are few landing fields except those we have established and there are no laws regulating aerial traffic. After we multiply our fields and lay down flying rules, then it may be advisable to call in flying mail contractors who would operate much as the Star Routes are now run. But these must always be under the control of the Post Office Department.

Plan New Lines

"The immediate executive of the aerial mail would find it practicable to co-operate in the development of special equipment with both the aircraft industry direct and with the Director of Aeronautics through his special equipment department. We would also co-operate with the Division of Civil Aeronautics in so far as civil aeronautics had anything to do with the carrying of mail; such as the establishment of landing fields, the laying out of routes, etc. Our personnel branch, through the executive of the aerial mail, would likewise work with the personnel and operative branches of the Department of Aeronautics and especially with the civilian activities. A similar plan could well be followed by the branch under which air mail contractors, if such are necessary, will operate.

"There is a great demand for extension of the aerial mail, but we are limited by reason of small appropriations. But we will carry the air mail daily to Minneapolis, Omaha and St. Louis by next spring.

"The Post Office Department had a bare $100.000 to start with and obtained about $800,000 more at the last session of Congress. This sum is being utilized in the operation of approximately a score of airplanes over the Washington, New York and Chicago route. Through co-operation with the Army we have recently obtained 100 De Haviland machines that, in their present state, are useless either for military or commercial work. These airplanes, equipped with Liberty engines, are being remodeled so as to carry 400 lb. of mail each. They will provide temporary equipment for the air mail lines that must be established this fall.

Will Save 1½ Millions

"Two other great steps taken by the Post Office Department are the adoption of a synthetic fuel and the development of a fire extinguishing liquid which can be injected into the gasoline or alcohol tank in case of conflagration. Tests have proved that industrial alcohol can be obtained for the same price as high-grade gasoline and that it will prove 20 per cent more efficient.

"Within the next few weeks we expect to fly the mail between Cleveland and New York without making an emergency stop at Bellefonte, Pa., as has been the case since last spring. Early this winter we expect to have in the air at least several of the fourteen big cargo machines now under construction in New York, Cleveland and Ithaca.

"The L-W-F cargo mail ship, it is expected, will make non-stop flights between New York and Chicago, carrying 3000 lb. of letter mail in addition to a crew of three men, who will have sleeping quarters aboard. The Glenn L. Martin and Thomas-Morse cargo ships will be slightly smaller, but will be heavily powered and capable of making a New York-Cleveland-Chicago flight with great speed and regularity.

"With these in operation, the Post Office Department, through its aerial mail, will save one and a half million dollars a year over the present cost of first-class mail transportation."

Electric Cars In New York Showing

Automobile and Accessory Makers Exhibit at the New York Electrical Show

NEW YORK, Sept. 24—The first exhibition of electrical motor cars and equipment opened at the Grand Central Palace here to-day and will continue until Oct. 4, in connection with the New York Electrical Show. Several makers are exhibiting their entire line of cars and trucks. Accessory makers and other showings include electrical fixtures and fittings for garages and shops of all kinds.

The exhibit opening to-day was the first to be held at the Grand Central Palace since the building was taken over by the government for use as a war hospital. Many partitions have had to be removed to make way for the showing, and workmen have been busy for weeks tearing down the hospital equipment so that now it has assumed once more its pre-war appearance. The National Motor Car Show will be held there in January.

Among the automobile exhibitors are the Ward Motor Vehicle Co.; the Walker Vehicle Co.; the Baker R. & L. New York Corp.; the Commercial Truck Co. of America; the Metropolitan Detroit Electric Auto Co.; the Electric Storage Battery Co.; the Bennage Co., and the Philadelphia Storage Battery Co.

BODY CONCERN LOCATES

SAGINAW, MICH., Sept. 16—The Erdmann-Guider Co., a $500,000 automobile body concern, will locate a factory in this city in the Bransfield Building. The company has been in operation four years in Detroit, and makes special closed bodies and hearses. The business will be expanded here. Two hundred and fifty men, many of them coming from Detroit, will be employed.

Determining Impact of Trucks on Road

Bureau of Public Roads Using Special Device for Testing Truck Effect on Highways

NEW YORK, Sept. 22—Experiments are being conducted by the Bureau of Public Roads at the Arlington Experimental Farm of the Department of Agriculture to determine the impact of motor trucks on the road as dependent upon speed, power of propulsion, character of tires used, spring suspension, etc.

A special testing device has been installed, consisting of a heavy steel cylinder in which is fitted a plunger four inches in diameter and eight inches long, similar in construction to a hydraulic jack. A hole is left in the bottom of the cylinder in order to prevent air cushioning under the plunger. On the top or head of the plunger there is securely fastened a heavy steel plate on which the impact of the truck wheel is received. This whole apparatus is supported rigidly in a concrete box placed in the road in such a position that the height of the steel plate on top of the plunger may be made just flush with the road surface.

Description of Testing Device

The height of the upper surface of the plate can be varied by proper steel disks placed under the plunger. In order that the front wheel may pass over and not touch the steel plate on the plunger, a steel bridge is used which is automatically tripped by the front wheel in passing over it. This releases a catch and allows a weighted lever to pull the bridge clear from the apparatus, thus leaving the steel plate exposed and ready to receive the impact of the rear wheel. By variations this bridge may be used to allow the impact of the front wheel to be received and then protect the plate from the impact of the rear wheel. The approach to this impact apparatus is made of 2-in. planking about twenty feet long and is so constructed that the height of the planks may be varied above the road surface to give various heights of drop, and also can be moved forward or backward to give the proper jumping distance from the jump-off point so that the wheel will strike the center of the plunger at all speeds.

For recording the impact value a copper cylinder one-half inch in diameter by one-half inch long is placed under the plunger of the jack. The impact received on the plunger is transmitted to the copper cylinder, where it produces a corresponding permanent deformation. The copper cylinders for this investigation are prepared from pure copper bars and are carefully machined to dimensions. They are then annealed and tested.

In the experiments use was made of a 3-ton class B military truck fitted with solid rubber tires.

"The impact condition under which these tests were conducted was the simple falling of the truck wheel from one level to another at different speeds of the truck," a preliminary report says, "the height of drop varying from a quarter to three inches. Other conditions of impact will be investigated later. The magnitude of the impact is dependent upon: (1) height of drop, (2) weight of truck and load, (3) kind and condition of tires, (4) characteristics of springs, and (5) speed of truck.

"The tests thus far give only the relative impact values, and do not attempt to demonstrate the destructive effect of these impacts. The destructive effect depends upon the road surface, the type of construction, and the foundation, and to arrive at the destructive effect of these impact forces, it is proposed in another series of experiments to submit certain road surfaces to these same impacts delivered repeatedly, until failure occurs. Machinery for this purpose is now under construction."

M. A. M. A. Representatives Named for Joint Board

NEW YORK, Sept. 22—M. L. Heminway, the general manager, and S. S. Meyers, the general counsel, will represent the Motor and Accessory Manufacturers' Association on the joint legislative committee recently authorized by the five large automotive associations. The appointment was made by the board of directors of the association at a meeting just held here.

The joint committee will soon hold its first meeting at the rooms here of the National Automobile Chamber of Commerce. It will consider co-operative effort by the organizations to push several bills now before Congress involving the automotive industry—the Chamber of Commerce, the accessory association, the National Automobile Dealers' Association, the American Automobile Association and the Trailer Manufacturers' Association.

MAKING PISTON PINS

ANN ARBOR, MICH., Sept. 18—The Machine Specialty Co., which recently increased its capital stock from $10,000 to $135,000 and which has increased its production facilities, will also expand its field of activities and become a manufacturer of automobile parts. The company, it is said, will specialize in piston pins.

RELIANCE WHEEL ADDITION

YOUNGSTOWN, OHIO, Sept. 19—The Reliance Wheel Co. will erect a new factory here on a tract of land recently purchased, which is on the main line of the Erie and New York Central lines. The company makes double disk wheels for automobiles, trucks and airplanes.

OSHKOSH TRUCK TO BUILD

OSHKOSH. WIS., Sept. 22—The Oshkosh Motor Truck Co. has purchased a site at High and Forest streets for its proposed new works, the first unit of which will be 150 x 300 ft. Work will begin in October.

Rolls-Royce Forms American Company

Will Build the English Car In America—Capitalized at $7,000,000

NEW YORK, Sept. 23—Plans were announced here to-day for the formation of a corporation capitalized at $7,000,000 to manufacture Rolls-Royce cars in this country. The announcement was made by Aldred & Co., bankers at 24 Exchange Place, that they had agreed to finance the proposed corporation as a branch factory of the English firm of Rolls-Royce, Ltd. It will be financed entirely by American capital as, under present war acts, British capital cannot be transferred to other companies for industrial purposes.

The American company, however, will manufacture a chassis practically identical with that made in England. The Rolls-Royce aero engine, parts of which were built in America during the war, also will be constructed at the new factory, the location for which was not announced.

The financial plan, in itself partially incomplete as yet, was the only detail announced. It was said that the stock would be offered in about two weeks, despite the fact that some of the organization plans have not been perfected. The name of the new corporation probably will be Rolls-Royce of America, Inc., and at least some of the company personnel will be from the home factory.

Announcement of the plan preceded by a few hours the departure of Claude Johnson, directing manager of the English company, on the steamer *Cedric* for Liverpool to-day. Johnson, who spent some time in America earlier this summer, returned here last week and has been in daily conference with financial and manufacturing men.

Location of the proposed plant and the production plans could not be ascertained from the local branch of Rolls-Royce, Ltd., at 23 William Street. Maurice M. Olley, the company's engineer here, said that it would not be determined for at least two weeks whether the American company would purchase or build a factory in this country. Several plants used in munitions making during the war have been under consideration.

The announcement of the bankers was to the effect that the American company would "have all the advantages of Rolls-Royce design and knowledge," and that the chassis and engines manufactured in this country would be of the "same standards" as those made in Great Britain. The announcement also set forth that the plant was made necessary by the American demand for Rolls-Royce cars which would not be met from England as the plants there have booked orders that will occupy them for some eighteen months.

The price of the chassis was stated as being $10,000, and the company was said to have branches at New York, London, Paris, Madrid and Bombay.

G. Chevrolet Wins at Sheepshead Bay

Frontenac Driver Scores Victory Over Brother—Boyer and Vail Follow Leader

NEW YORK, Sept. 20—Gaston Chevrolet took the laurels at to-day's 150-mile race at the Sheepshead Bay Speedway when he drove his Frontenac to first place and a new record of 1 hr., 22 min., 34 1/5 sec., clipping nearly four minutes off the old time of 1 hr., 26 min., 14 9 sec., made by Ralph Mulford at Chicago in a Hudson, in June, 1917. Chevrolet led the field by two laps, with Joe Boyer in a Frontenac and Ira Vail in a Philbrin Duesenberg following in second and third places.

The winner's brother, Louis Chevrolet, pushing his Frontenac to its limit and battling with Gaston for the lead, went out of the race at the end of the 110th mile when his car caught fire and was driven into the pits a mass of flame. From almost the first lap the two Chevrolets had raced side by side, first one and then the other leading as they flashed by the judges, well ahead of the field. Gaston was setting the pace as they drove into the home turn on the fifty-fifth lap. Then Louis' car took fire and raced to the pits with driver and mechanician, Ralph Goodson, fighting the flames that threatened to envelop them. Both were severely burned about the arms and legs and, of course, were out of the going.

The Thirty Mile Special Event

The day was one of thrills for the spectators. In the last lap of the third heat of the special ten-mile event Ralph Mulford, with James Lee, mechanician, were leading on the last turn when a tie rod snapped on the steering apparatus of the Duesenberg and the car plunged down the curve into the soft ground beside the track. Then it turned, in a cloud of dust, and plunged back across the course, narrowly missing another car, and crashed into the steel guard rails. Neither was injured, although Lee walked limping into the pits.

This special event was won by Louis Chevrolet, who took two of the three laps, with Gaston Chevrolet as second and Joe Boyer and Mulford tied for third. The best time of the three laps was 5 min., 24 1/5 sec., made by Mulford.

Ralph De Palma's hard luck followed him throughout the day. His Packard Special, with a broken connecting rod, went out in the first lap of the ten-mile event. Then he changed to a White Special for the last lap of this event and the longer grind. But three trips to the pits for tire changes kept him so far down that he did not finish the latter race.

Thirteen starters lined up for the longer race but only eight finished. The five who did not complete the distance were Bennett Hill, in an Aetna; Joe Thomas, in a Mercer; Dave Lewis, in a Meteor; L. Chevrolet and De Palma.

Position	Car	Driver	Time
1	Frontenac	G. Chevrolet	1:22:34 1/5
2	Frontenac	Joe Boyer	1:24:43 3/5
3	Philbrin	Ira Vail	1:24:46
4	Peugeot	Art Klein	1:25:24
5	Hudson	Toland Nicholson	1:30:28 1/5
6	Stickel	Denney M. Hickey	1:31:35 1/5
7	Frontenac	Ralph Mulford	1:33:06
8	Duesenberg	William Vetere	Flagged

Commercial Body Plant Will Distribute

OWOSSO, MICH., Sept. 24—The Field Manufacturing Co., maker of commercial truck bodies, will establish distributing centers in the principal cities of the United States in addition to manufacturing units for truck manufacturers.

An addition to its present plant is now in course of construction and will be ready for occupancy Nov. 15. Plans are being made for an output of at least 100,000 units during 1920.

Officers of the company are: President, J. F. Field; general manager, E. J. Frederick; office and production manager, F. H. Basom; general superintendent, A. L. Moyses; chief engineer, C. C. Thomas; general sales manager, A. L. Ditter; sales manager, F. J. Bosma; traffic manager, T. E. Latimer.

JORDAN BUYS METAL PARTS

CLEVELAND, Sept. 23—The property of the Metal Parts Manufacturing Co. on East 152d Street has been purchased by the Jordan Motor Car Co. and will increase the ground area of the Jordan company by one-third. It will permit an increase of floor space of more than 30,000 ft., and production of Jordan cars will be increased four times what it was in the three first months of 1919.

TRAILER COMPANY ORGANIZED

LOUISVILLE, KY., Sept. 20—Announcement was made here to-day of the formation of the Byron Engineering Works, with a capitalization of $175,000, to manufacture trailers embodying new designs. Production is expected to be under way soon at a factory for which plans have been made. The annual production, according to plans, will total about $750,000. Local business men are behind the company, among them being J. Stoddard Johnston, Jr., Robert F. Vaughan, J. Wallace Vaughan, Edgar Ezzell, William A. Reisert, Graeme McGowan, Henry W. Imorde, Richard M. Bean, I. T. Axton, J. W. Oliver, Joseph Burge, Caldwell Norton and Tampton Aubuchon. The offices are at 711 Columbia Building.

Production Plans of Slick-Knox Steel Co.

SHARON, PA., Sept. 22—Production plans for the recently formed Slick-Knox Steel Co. here call for an output of 700 truck frames daily by Feb. 1, 1920, and factory construction has been gotten under way so that the present output may be increased to that amount.

The company is a $6,000,000 corporation that was formed in June of this year, taking over the plants of the Blaw-Knox Steel Co. here and those of the Hydraulic Drawn Forge Co. and the Pressed Steel Products Co. at Ellwood, Pa. A new machine shop and a frame assembling unit are under construction here.

The company is headed by L. L. Knox as president. He formerly was vice-president of the Blaw-Knox company. E. E. Slick, formerly chief engineer of the Carnegie Steel Co., and vice-president and general manager of the Cambria Steel Co., is chairman of the board of directors. Other officers are William McIntyre, vice-president and general manager; C. K. Strasbraugh, operating manager, formerly of the Standard Car Construction Co.; Andrew Moreland, treasurer; A. R. McGill, secretary; Walter F. Shultz, chief engineer, and John Curtis, general superintendent. Both Shultz and Curtis formerly were connected with the Savage Arms Co.

In addition to truck frames, the company will turn out hot and cold stampings, drop forgings and similar products.

NEW YORK TO PHILADELPHIA IN 29 MINUTES

NEW YORK, Sept. 20—The distance between the Statue of Liberty and City Hall, Philadelphia, was covered in 29 min. last Wednesday, at a speed of 180 m.p.h. by the United States Naval Loening monoplane, which was wrecked in the landing at Philadelphia. The machine was piloted by Lieut. Com. Edwin McDonnell.

DAILY ROAD BULLETINS

The Automobile Club of Rochester has adopted a method of notifying the police department daily as to the condition of the roads leading out of the city. A copy of this report is furnished to traffic officers, also a route card showing the best routes within a 100-mile radius of the city.

WESTERN MACHINE INCREASES

MILWAUKEE, WIS., Sept. 22—The Western Machine Co., 248-250 Fourth Street, has increased its capital stock from $5,000 to $25,000 to enlarge its production.

SELDEN TRUCK CORP.

ROCHESTER, N. Y., Sept. 23—The Selden Truck Corp. is the new name of the Selden Truck Sales Co. and the new company will assume all obligations and contracts of the Selden Truck Sales Co.

Show Wage Increase In Motor Industry

WASHINGTON, Sept. 20—Wages in the automobile industry increased 5.6 per cent for June, 1919, as compared with June, 1918, while at the same time the numbers employed increased but 2 per cent, according to the Department of Labor. There was a decrease in the amount of the payroll for June, 1919, as compared with May, 1919, of 3.6 per cent, although the numbers employed increased for June, 1919, over May, 1919, by 5.5 per cent.

The table of comparisons shows that forty-two companies reported for the comparative figures of June, 1918, and June, 1919, the employment being shown as 100,981 with a weekly payroll of $2,589,660 for the period last year as against employees numbering 102,952 with a weekly payroll of $2,733,949. The comparison between May and June of this year showed May to have had 93,996 employees with a wage of $2,759,780, while the June figures showed 99,169 employees earning $2,660,956. The last comparison was compiled from statistics from but forty companies.

BODY COMPANY SOLD

DETROIT, Sept. 16—The Bennett-Sustrich Co. has purchased the body manufacturing business of the Southwick-Pom Co. and will continue it. James J. Bennett, who formerly was superintendent of the Southwick-Pom Co., is president of the new organization, with James S. Southwick as treasurer. The reorganized company is one of the pioneer body builders of Detroit.

NORTHERN WHEEL FACTORY

ALMA, MICH., Sept. 16—The Northern Wheel Co. has let the contract for the first unit of its $1,000,000 factory and work will start at once. The plant will be in operation Dec. 1. It will be constructed of brick and concrete and will be 80 x 304 ft. The officers of the new company are: President, A. D. Smith; vice-president, J. W. Blakley; secretary, Orville Allen; treasurer, E. L. Smith.

VIM TRACTOR EXPANDING

MILWAUKEE, WIS., Sept. 15—The Vim Tractor Co. at Schleisingerville, Wis., which was organized some time ago out of the former Standard Machinery Co., manufacturer of gas engines, will start work soon on a large machine shop and assembling floor costing about $75,000, to provide an increase of 50 to 75 per cent in the existing capacity.

ADDITION FOR DOMINION TIRE

KITCHENER, ONT., Sept. 19—The Dominion Tire Co., 149 Strange Street, will erect a $150,000 addition to its factory.

MADISON TIRE & RUBBER

BUFFALO, N. Y., Sept. 22—Initial daily capacity of the new factory here of the Madison Tire & Rubber Co. recently organized to manufacture Madison tires and tubes, will be approximately 1200 tires and 2000 tubes, with a working staff of about 500. It has opened sales offices at 254 West 57th Street and executive offices at 30 East 42nd Street, New York City.

Winther Will Build Milwaukee Plant

MILWAUKEE, WIS., Sept. 22—Following closely upon the announcement by the Nash Motors Co., Kenosha, Wis., of the establishment of a factory in Milwaukee, the Winther Motor Truck Co., Kenosha, has made public the fact that it has signed an option for a site here upon which it expects to erect a new plant costing $250,000. The present large factory in Kenosha will be continued in full operation and general officers will remain in Kenosha.

The Winther Company is marketing an issue of $500,000 of 7 per cent preferred stock to finance the new branch factory. Its authorized capital is $2,100,000, of which only a little more than $1,000,000 has been outstanding.

NASH BUILDING IN MILWAUKEE

MILWAUKEE, Sept. 20—The Nash Motors Co. during the week let the contract for erecting the first unit of its new Milwaukee works here at Clement and Oklahoma avenues. The building will be 200 x 600 ft., with sawtooth roof, and requires 450 tons of structural steel and 45,000 to 50,000 sq. ft. of steel sash. Construction work begins this week.

Within thirty days contracts will be let for a power and heating plant and an additional shop unit. Within a year's time it is hoped to invest $3,500,000 in buildings and equipment and provide a working force of 4000 men.

HARLEY-DAVIDSON ADDITION

MILWAUKEE, WIS., Sept. 15—The Harley-Davidson Motor Co., Milwaukee, will build a six-story addition, 120 x 225 ft., to its main works at Thirty-eighth and Chestnut streets. The building will cost $200,000 and the equipment an additional $100,000 to $150,000.

F. W. D. IN CANADA

KITCHENER, ONT., Sept. 20—The F. W. D. Auto Co. will commence construction of its new factory in the east end of the city as soon as definite information concerning the new location of the Grand River Railway is received.

TRIMMING CONCERN ADDS

WALKERVILLE, ONT., Sept. 20—The American Auto Trimming Co. will erect a five-story addition to its plant at a cost of about $160,000.

CANADIAN RUBBER ADDITIONS

KITCHENER, ONT., Sept. 19—The Canadian Consolidated Rubber Co. will spend $1,000,000 on improvements and additions to its plant for the purpose of increasing its output.

Rules That Makers May Fix Sale Price

Federal Court Holds Schrader Company Not in Violation of Trust Laws

CLEVELAND, Sept. 19 (*Special Telegram*)—The A. Schraders Sons, Inc., of New York, manufacturers of valves, valve parts, pneumatic pressure gauges and other accessories, won a victory in the United States Court of this city, that may mean much to manufacturers in this country.

Federal Judge D. C. Westenhaver, of the Federal District Court, Eastern Division, to-day filed with the clerk of courts his decision in the case which the Government, through District Attorney E. S. Wortz, had filed against the company. Judge Westenhaver ruled, in substance, that manufacturers legally may fix the price at which dealers must sell their products.

The Schrader company was indicted on a charge of violating the Sherman Anti-Trust law, the express charge being that the company, in violation of the Anti-Trust provision, dictated to dealers the prices at which they must resell Schrader products.

Not Contrary to Sherman Law

The Court, in giving decision, said:

"I interpret it (the indictment) as charging that the defendant has made contracts with all tire manufacturers and jobbers to whom it sells its products to execute uniform contracts, and that these contracts contain provisions requiring that they shall not sell to jobbers, vehicle manufacturers, retail dealers and the consuming public except at certain prices fixed by the defendant.

"The Sherman Anti-Trust law, as I construe it, in the absence of the other and additional allegations charging an intent and purpose to monopolize trade, does not make the acts thus charged a crime, and this conclusion is the same, despite the fact that defendant contends this product is covered by patents which permit it to control the resale prices in the manner set forth in the agreements exhibited with the indictment.

"The point which I wish to emphasize is that the allegations of this indictment, not alleging any purpose to monopolize interstate trade, within the prohibition and meaning of section two of the Sherman Anti-Trust act and the last clause of section two of the Clayton Act, does not charge a crime under section one of the Sherman Anti-Trust act as that act should be construed."

MASTER SALES CORP. ORGANIZED

CHICAGO, Sept. 12—The Master Sales Corp. has been incorporated to distribute Master carbureters in Illinois, Indiana and Iowa, with headquarters at Chicago. Officers are: William Tesnow, president; C. J. Abbott, vice-president and sales manager; Edward J. Morse, secretary and engineer, and A. T. Herman, treasurer.

Interest Keen At Los Angeles Show

Tractor Demonstration Is High in Sales Value—Exhibit Power Machines

LOS ANGELES, Sept. 19 (*Special Telegram*)—The fourth annual tractor demonstration held by the Southern California Implement Dealers' Association here this week, judged by attendance, interest, quality of exhibits and sales, unquestionably was a valuable exhibition. It was a distributers demonstration, however, and was not staged by manufacturers.

The demonstration was conducted without real rules. Practically the only stipulation was that plowing should at least be six inches deep and some of the machines had difficulty in meeting this condition. There was no competition of any kind.

The exhibition was not conducted to interest dealers except as a secondary consideration. Its aim was to stimulate sales directly to the users. The largest single day's attendance has been 20,000 and it was not considered probable that this figure would be exceeded, although the demonstration will continue over next Sunday. The attendance is not as large as in previous years but those participating say that there was more genuine interest displayed than ever before and that a greater number of sales would result.

Farm Implements as Well as Tractors

All efforts have been directed toward getting out the ranchers themselves. Sales have been made to actual users who have come from points in Nevada, Arizona and San Joaquin Valley. Representatives of four foreign governments have been almost daily visitors.

Twenty-nine makes of tractors were shown, each being demonstrated with from two to six models. Apparently it was just as much a farm implement show as it was a tractor demonstration. This undoubtedly was due to the fact that with only two or three exceptions, all tractors represented in Southern California are controlled by farm implement dealers. In addition to tractors, there were shown devices of all sorts that may be considered as saving in farm labor. There was a liberal display of automotive accessories and a few motor trucks and light delivery cars. The showing, however, did not prove much of an investment for the truck exhibitors as their displays received only scant attention. A well directed drive to show the value of trucks on the farm might have accomplished something worth while with such a large gathering of land owners.

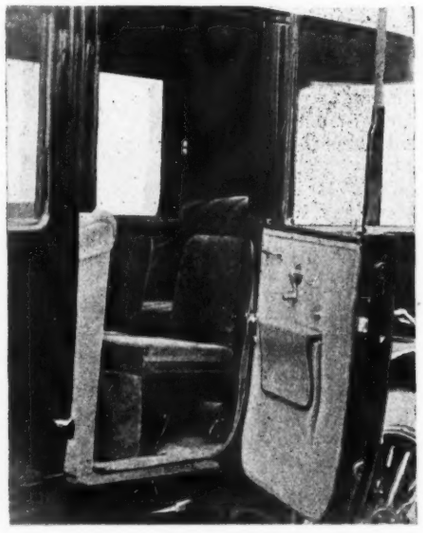
It should be said to the credit of the demonstration that more attention than ever was paid to showing the adaptability of tractors for stationary use. Tractors were kept running the entire day pumping water.

In Southern California, the ranches must be irrigated. You cannot plow when water is being run through the fields, therefore, you could not use the tractor for plowing at that time but you can use it for lifting the water. It saves the expense of stationary engines for pumping water, and these engines do not operate when plowing is being done. The tractor is free for that work when needed.

Similar reasons might be applied to ensilage cutting, operating wood saws, digging post holes, pulling stumps, dragging out underbrush or breaking new land. Let it also be said that the attention shown to tractor usage other than for plowing was not only educational but was of actual value as well. The plowing job was a difficult enough one in itself, however. The soil was oil gumbo and almost as hard as cement. Occasionally the plows would bite off more than they could handle. Plowing by tractor under these conditions cannot be regarded as a one man job, yet this was the same soil that is encountered in sixty per cent of the acreage upon which tractors will be used in this locality.

The dominant features of the demonstration were that competitive tests were tabooed rather than encouraged and that tractor representatives have learned they must show owners other uses for the machines than plowing.

Two New Interiors of the Moon 6-66 Sedan



CONTINENTAL AXLE ORGANIZED

EDGERTON, WIS., Sept. 22—The Continental Axle Co., organized to manufacture motor truck, trailer and tractor axles, has perfected its organization by electing these officers: President, Andrew McIntosh; vice-president, James Higgins, Racine, Wis.; secretary, E. Z. Menhall; treasurer, William McIntosh; general manager, James W. Menhall. The McIntosh and Menhall interests are heavily interested in the Highway Trailer Co., Edgerton. The Continental company is erecting a brick and steel factory, 68 x 290 ft., which will be ready about Nov. 15.

Truck Tours and Parades Growing in Popularity

NEW YORK, Sept. 22—The growing popularity of truck tours and truck parades, as sales builders, was evidenced here today by reports of coming events made to the rural express division of the National Automobile Chamber of Commerce.

A Baltimore parade was held last Saturday and consisted of several hundred trucks, the demonstration being under the direction of John C. O'Brien, general manager of the Baltimore Automobile Dealers' Association. A parade in Brooklyn is announced for Oct. 13, to consist of a demonstration of as many vehicles as can be obtained, through the business streets.

The tour from Buffalo, covering about 500 miles, is scheduled to start today and will continue all week. The Des Moines tour will start Oct. 13, and also will continue for a week, with a schedule calling for about 75 miles each day.

The bureau has just completed a review of its work at the recent New York State Fair at Syracuse. Requests from the "ship by truck" exhibit staged by the bureau in the State Institute Building, held in connection with those of several State departments and not designed to increase truck sales but merely to further the plan of rural truck express work, were such that more than 6000 pieces of literature were distributed from the booth, while 1097 persons asked that they be mailed more comprehensive data on such transportation.

MASON DENIES $10,000 AWARD

NEW YORK, Sept. 19—Credited reports of the award of $10,000 in prize money to Dave Lewis at the Uniontown, Pa., races on Sept. 1 by the Mason Tire & Rubber Co. were denied here to-day by officials of the rubber company. The announcement stated that no award had been made. Lewis finished fifth, driving a Meteor.

Sue Nash Company For 2½ Millions

BALTIMORE, MD., Sept. 18.—The Nash Motors Co., a Maryland corporation, was made defendant in a suit for alleged damages of $2,439,650, filed in the Baltimore City Court today. Frank Joseph Goldsoll, said to be a former private in the French Army, and who was under arrest for a time at Washington last March, upon a warrant sworn out by Chancellor Bergeron of the French Embassy, charging him with larceny of between $3,500,000 and $6,000,000 from the French Government, is the plaintiff. The sum named in the suit is alleged to be due the plaintiff on a contract for the sale of motor vehicles and parts, on commission.

The declaration states that a contract was made with the Thomas B. Jeffrey Company, a Wisconsin corporation on Aug. 3, 1915, and Oct. 12, 1915. The petition says the Nash Company succeeded the Jeffrey firm and assumed all of its obligations. Goldsoll claims he was to be paid 27.65 per cent on all motor cars, trucks and other products of the Jeffrey Company sold by him to France, Serbia and Belgium.

The papers state that the Nash company sold to the United States for use in France and Belgium 3,000 motor truck chassis for $2,700 each, or $8,100,000, and spare parts valued at $723,363, and that the money has been received by the Company. Goldsoll claims his commission of the sale amounts to $2,439,650, or 27.65 per cent of the amount of the sale.

RACINE RUBBER ADDITION

RACINE, WIS., Sept. 22—The Racine Rubber Co., western division of the Ajax Rubber Co., Trenton, N. J., has awarded contracts for the erection of a four-story addition to the factory, increasing the area 80 x 160 ft. The building and equipment will represent an investment of about $100,000. It is expected to be ready for occupancy by Nov. 1 or 15.

HICKS TRACTOR OFFICES

MILWAUKEE, WIS., Sept. 22—The Hicks Tractor Co., organized in South Dakota with an authorized capital stock of $1,000,000, has been granted a Wisconsin charter. Offices have been opened in the First Wisconsin National Bank building, in charge of Rex P. Hicks.

GILLETTE INDUSTRIAL FEDERATION

EAU CLAIRE, WIS., Sept. 15—The Gillette Rubber Co. Industrial Federation has been formed to bring a closer union of company and workers. The membership is derived from both elements in equal proportion. Each department constitutes a council, with a chairman and secretary elected by the workers. Each council elects a representative, one for every twenty members or fraction thereof, to serve on the factory board, consisting of workers only, no foremen, which in turn elects four members to serve on a general executive board of eight. The other four members are the plant superintendent, supervising engineer, a vice-president, and a foreman elected by the foremen.

Each council handles the welfare work, disputes or disagreements of its members, reporting to the executive board, the action of which goes to the vice-president and general manager, with provision for appeal to the president and final recourse in arbitration.

Case and Wallis Tractors Combine

RACINE, WIS., Sept. 20—The J. I. Case Plow Works and the Wallis Tractor Co. have consolidated under the name of the J. I. Case Plow Works Co., with a capitalization of $10,000,000. With the additional capital factory space will be enlarged and production increased.

H. M. Wallis will head the concern, with H. M. Wallis, Jr., as his assistant. Other officers are: Vice-president, L. N. Burns; treasurer, W. M. LaVenture; secretary, M. E. Erskine; auditor, G. A. Filer; cashier, G. H. Bolton, and assistant secretary, Charles E. Pain, Jr. The officers and C. F. Glore, Henry R. Platt, William A. Tilden and W. C. Quarles complete the board of directors.

STEEL COMPANY FORMED

PITTSBURGH, Sept. 19—The Wyckoff Drawn Steel Co. has been formed with A. W. Wyckoff, former steel man and distributer of Chalmers and Reo cars in this district for several years, as president. G. R. Nutty is vice-president and Joseph T. Somers general manager of sales. Serving on the board with the officers are: A. L. Humphrey, William McConway, Jr., R. B. Keating and J. J. Komara.

The company's plant at Ambridge, Pa., has an initial capacity of 5000 tons per month. The mill will be in operation in December.

GLOBE FOUNDRY WILL BUILD

SHEBOYGAN, WIS., Sept. 22—The Globe Co., formerly the Globe Foundry & Machine Co., is separating its casting and machine departments. A new corporation, styled the Globe Foundry Co., has been incorporated with $100,000 capital to build a gray-iron foundry on a new site. The present casting shop will be converted into an addition to the machine shop, doubling the capacity. G. F. Honold, president of the Globe Co., is one of the principal owners of the new Globe Foundry Co. The company will continue to specialize in automotive castings and parts.

UNION SMELTING PLANTS

DETROIT, Sept. 16—The Union Smelting & Refining Co., of Newark, N. J., will build a plant here. Work will be pushed as rapidly as possible. The company has just completed a new plant at Newark.

Heavy Duty Trucks Chief Need in France

French Engineer Here to Purchase —Says Price Limit Is $3,300— Cars Converted To Trucks

NEW YORK, Sept. 22—The American maker who seeks to place a heavy duty truck on the French market, under the present conditions of exchange and customs, must be prepared to fix a price in that country not in excess of 30,000 francs, or about $3,300. That assertion was made here today by Pierre Fevrier, of Vichy, France, an engineer of the Etablissements J. Epinat of that city, who recently came to America in search of a truck that could be purchased, knocked-down, and assembled in the Epinat plant. The market today in France calls for a heavy truck of from 3 to 5-ton capacity, Fevrier believes.

Small Demand for Light Trucks

Despite four weeks of endeavor, he has not yet been able to arrange with an American maker for importation such as he desires. He expects, however, either to obtain a complete truck or to effect the purchase of necessary parts before leaving in October.

"Import taxes on trucks into France are much less for those weighing in excess of 2,500 kilograms (about 5500 lb.) than for a smaller size," he said. "The larger sizes are yet taking the pre-war rate, although a readjustment may soon be made."

Fevrier also believes that French industry has only small demands for the lighter truck and that there is practically no call for the machine having a capacity of from ¾-ton to 1-ton.

Despite this statement, Fevrier added that many used passenger cars are being converted into small trucks in France and that for this and other reasons the used car markets in all parts of his country have sky-rocketed to unexpected heights. One car of a 1913 model, he instanced, had been purchased from the factory in that year for 16,000 francs, and this year had commanded a resale price of 28,000 francs.

Restricted to Commercial Companies

The Epinat works were devoted entirely to the manufacture of large caliber shells during the war. Now, it is desired to convert them into a truck factory, as M. Epinat, the owner, is likewise interested in a government subsidized transportation company operating motor transport lines from Vichy and Clermont-Ferrand. Some military vehicles have been purchased for this use, but, Fevrier declared, the demand has not been met.

Furthermore, he added that trucks were in such constant use by the military that the French manufacturer and business man have become converted to their use. The entire field, however, is restricted to commercial companies, as the French peasant and farmer does not at present offer a worth-while market.

First Sale of Army Cars Totals $25,000

Seventy-five Unserviceable Machines Auctioned at Camp Holabird—Sales Continue

BALTIMORE, MD., Sept. 18—Between three and four thousand persons to-day attended the first government sale of unserviceable cars at Camp Holabird, the government motor station and purchased 75 cars of various models, the sale aggregating $25,000. But few of the machines appeared to be of a kind that would navigate under their own power. The conditions of the sale provide that the machines must be removed from the camp within 48 hours.

This was the first sale of a series, the next one will take place Thursday of next week. The first car brought $130, although the opening bid was $5. A limousine purchased by a dealer brought $650, the highest price. The average bid was under $200. Next week the sale will be of trucks. There are said to be about 11,000 trucks to be sold.

Practically all of the cars sold to-day will have to be junked and the parts will bring to the dealers their profits. A few of the bodies, especially the closed models, will provide the greatest profits. Ford cars were in the majority and brought all sorts of prices. The tires for the cars were in the body of the cars and had to be put on the wheels.

C. R. Durben acted as chief clerk to Maj. R. C. P. Evans of the Operative Division, who had charge of the sale.

WISCONSIN TRANSPORTATION BUREAU

MILWAUKEE, WIS., Sept. 15—A new idea in handling the vast amount of motor truck and other mechanical equipment now in the hands of the Wisconsin State Highway Commission, as the result of direct purchase or contribution by the Government of army vehicles, has been introduced by the commission. Announcement has been made of the appointment of Walter Alexander of Milwaukee, formerly a major of the Motor Transport Corps, as chief of the bureau of motor transportation, Wisconsin State Highway Commission.

Before the War Department turned over a large amount of army transport equipment for distribution among the states, the Wisconsin Highway Commission's mechanical equipment was regarded as the most extensive and comprehensive of any of the states. The addition of Government vehicles is said to have given Wisconsin an equipment which exceeds that accumulated by any other commonwealth, making it advisable to create a special department for its care, repair, maintenance, distribution and supervision.

French Farman Planes Coming to America

NEW YORK, Sept. 30—Sales offices in America for Henri & Maurice Farman of Billancourt, France, makers of the Goliath and other Farman planes, will be opened here Oct. 1 at 1 West Thirty-fourth Street. Announcement of the representation was made here today by W. Wallace Kellett, who arrived recently from France as the Farman agent.

Planes will be shipped from France and assembled on Long Island, where hangars and shops will be erected. A three-passenger tourabout plane has been shipped from France for demonstration. Kellett expects Louis Gaubert, the French test aviator and pilot who was credited with having brought down the second Hun machine in the war, to arrive in America soon to act as demonstrator.

GERMANS ESTABLISH AIR LINES

WASHINGTON, Sept. 15—Germany now has several air routes in operation, according to a recent commerce report. On the Berlin-Hamburg route, there are three to four aerial expresses each day. Return tickets are issued and are valid for 30 days. Serial tickets available for ten flights on any of the routes are issued at 3,600 marks. The normal exchange value of the German mark is $0.238.) Luggage is carried free of charge, but the total weight of passenger and luggage is limited.

Rohlfs Makes New Altitude Record

NEW YORK, Sept. 19—All altitude records were shattered yesterday when Roland Rohlfs ascended to a height of 34,610 ft. in his Curtiss Wasp triplane equipped with a K-12 400-hp. engine. In an unofficial flight last week he reached a height of 34,200 ft. Yesterday's achievement, however, was officially observed and confirmed throughout, and broke all previous records.

This last flight marks the fourth time that Rohlfs has ascended more than 30,000 ft. in the same machine since last July, and in each flight he has beaten all competitors by returning to the same field from which he started. On July 30 he made an official record of 30,700 ft. The highest credited record until this time has been held by Adjutant Casale of the French army, who ascended 33,136 ft. on June 14.

The entire flight was made in 1 hr. 53 min. At the height of 34,610 ft. the temperature was 43 deg. below zero, one degree warmer than it was at the height of 34,200 ft. made last Saturday. It was observed by a committee composed of Prof. C. L. Poor of Columbia University, Sydney B. Veit, Augustus Post of the Aero Club of America, Lieut. Col. J. D. Carmody, Maj. H. J. Miller, Maj. E. B. Lyon and J. G. Coffin.

In discussing his feat, Rohlfs said that he accomplished his record without any supercharger or any other motor accessory, and is convinced that his machine cannot go any higher. He says, too, that he is through with altitude flying, as it is too severe a physical strain.

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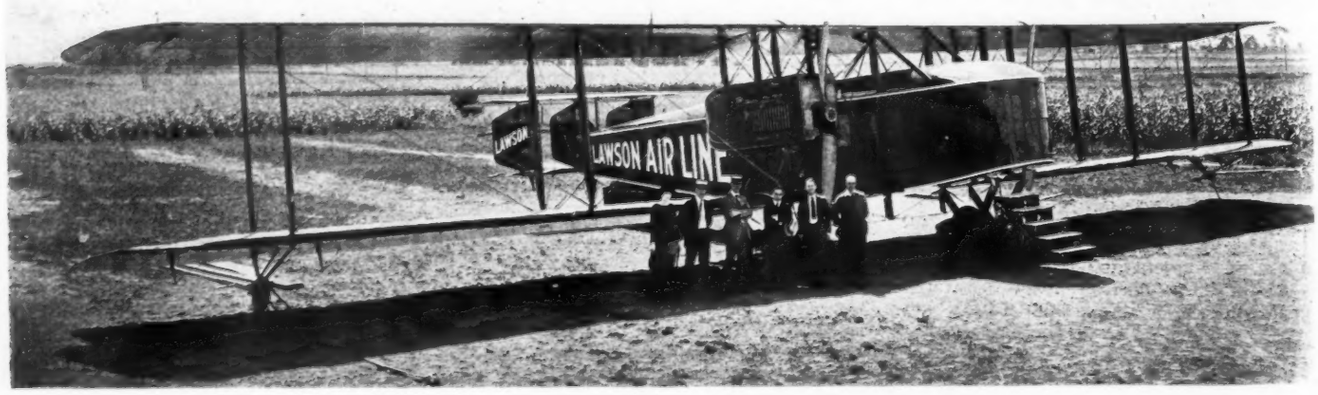
NEW YORK, Sept. 20—Yesterday Roland Rohlfs broke all world's records for climbing by rising to an altitude of 19,500 ft. in 9 min. 42.4 sec. This feat was accomplished at Roosevelt Field, L. I., in his Curtiss Wasp triplane, which on Thursday broke all altitude records by rising to an altitude of 34,610 ft. in 75 min.

Yesterday's flight was officially observed by Lieutenant Colonel J. D. Carmody and Augustus Post of the Aero Club of America.



The giant airplane of the Lawson Air Line Transportation Co. will be used for transcontinental passenger service. It is equipped with two 12-cylinder engines, and can be banked at an angle of 45 deg. while running on one engine

Latin American Importers and Dealers Listed

WASHINGTON, Sept. 20—Lists of importers and dealers in automobiles and accessories have been prepared by the Latin American Division of the Bureau of Foreign and Domestic Commerce. These lists may be obtained from the bureau or its district and co-operative offices by referring to the following titles and file numbers:

Importers of Automobiles and Accessories —Guadeloupe, 9676; Curacao, 9777; Jamaica, 9778.
Automobile Importers — Fort-de-France, Martinique, 9779.
Automobile Agents and Garages—Trinidad, 9780.
Importers of Automobiles and Accessories —Nassau, Bahamas, 9781; Brazil, 9783.
Automobile Importers—La Paz, Bolivia, 9842; Mexico City, 9843; Buenos Aires, Argentina, 9844.
Importers of Automobiles and Accessories —Santos, Brazil, 9859.

INDUSTRIAL FAIR FOR JAVA

WASHINGTON, Sept. 19—The industrial fair to be held in Bandoeng, Java, during May, 1920, presents an opportunity for American manufacturers to exhibit bicycles and motorcycles, states a recent Commerce Report. Information regarding reservations may be obtained from the Secretary of the Industries Fair, B. J. Krol, 39 Oosteide, Bandoeng, Java.

AIR MAIL IN COLOMBIA

NEW YORK, Sept. 17—An aerial mail in Colombia, between Bogota and other points, will be instituted soon, according to legation information here. Bids for the planes will be opened at Bogota, the capital, on Nov. 2, it was announced.

JAPAN TO HAVE AIR MAIL

WASHINGTON, Sept. 20—An air postal service is to be inaugurated between Tokyo and Osaka, Japan, according to the Far Eastern Division of the Bureau of Foreign and Domestic Commerce. The Imperial Aviation Society, a semi-official organization for the promotion of aviation, and the Department of Communcations are to co-operate in maintaining this service.

IMPORTS TO CHINA

WASHINGTON, Sept. 15—Automobiles valued at $1,518,666 were imported into China in 1918, 48 per cent of which came from the United States, according to a recent report from the American Chamber of Commerce, of China.

PETROLEUM COMMITTEE MEETING

WASHINGTON, Sept. 19—A meeting of the Committee on Standardization of Specifications for Petroleum Products has been called for Sept 29 by M. L. Requa, the chairman. The meeting will be held in the conference room of the Bureau of Mines, Department of the Interior, Washington, D.C.

Representatives will be present from the Bureau of Mines, Bureau of Standards, War Department, Navy Department, Shipping Board, Railroad Administration, American Petroleum Institute, and from a number of the leading oil companies.

The report of the Bureau of Mines on the revision of the present specifications for motor gasoline will be considered, and probably some of the lubricating oil specifications will be discussed.

New Italian Tariff May Not Be Effective Until November

WASHINGTON, Sept. 20—Unofficial information has been received that the new Italian tariff, expected to take effect Sept. 20, probably will not be in force until November, a recent Bureau of Commerce Report stated. This does not imply, however, that the status quo will be maintained in the meantime on all classes of goods. It is probable that certain classes of goods of Allied manufacture will be subject to the same rates of duty as those to be imposed on goods from former enemy countries.

REPAIRING GERMAN VESSELS

DETROIT, Sept. 20—The Detroit section of the Society of Automotive Engineers will hold its first meeting on the evening of Sept. 26 at 8 o'clock at the Hotel Pontchartrain. Capt. O. W. Koester, U. S. N., of the Bureau of Steam Engineering, will deliver the evening address on the welding repairs on the interned German vessels.

It will be remembered that the Germans said that it would require 3½ years to make repairs on these vessels. The American navy did it in 3½ months. Captain Koester is going to show how this was done. He was in practical charge of the work.

VENEZUELA CHANGES TARIFF

WASHINGTON, Sept. 15—Venezuela has made changes in the tariff classification so that axles for automobiles and repair parts for electric automobiles are now in the first class and pay duties amounting to $0.69 per 100 lb. gross. Bodies for automobiles, comprising body, cover, seats, mudguards and the tire carrier, are placed in the second class, plus 50 per cent with duties of $2.06 per 100 lb., according to a recent report from the Venezuelan Consul.

JOHNSTON EXPANDING

CHICAGO, Sept. 20—A tract of 2½ acres on Crawford Avenue has been purchased by the Wm. R. Johnston Mfg. Co. for a new group of factory buildings. The plant, which will cost about $200,000 when completed and equipped, is expected to be in operation in 90 days, with a capacity of 6000 curtain windows for automobiles a day, which is about double present production. The main building will be 381 x 120, and the mill and wood working plant will be 80 x 120 ft. The buildings will be of steel and concrete.

Central America A Field For Trucks

Salvador Road Builder Outlines Possibilities—Salesmen Must Speak Spanish Fluently

NEW ORLEANS, LA., Sept. 18—The republic of Salvador is starting its program of good roads, involving approximately $17,000,000, by building a paved highway from Santa Ana, the second largest city in the country, through the Auchapan coffee district, to connect with the railroad at Sosonate, according to N. Hampton, an American, who is in charge of road-building for the national government of the Central American republic. He is at New Orleans to purchase road-building equipment, including several large trucks.

"The Salvadorean government has an ambitious good roads program, involving a total expenditure of about $17,000,000," Hampton said. "The Santa Ana-Sosonate road is only one item in this plan, and will be 60 miles long, macadamized and surface-treated with asphalt. Its cost is fixed at $500,000, and it will give an outlet for motor trucks for the largest coffee district in Central America. This is the first and most important of the federal highways and is necessitated by the torrential tropical rains, which make all ordinary roads impassable for months at a time. The only macadamized road in Salvador at present is one recently finished from the port of Libertad to San Salvador, the capital of the republic, 25 miles in length.

"There is an excellent opportunity in Salvador and other Central American countries for the sale of American trucks and tractors, if they are introduced and demonstrated by men who speak Spanish fluently and who know just what is needed in this line for service in the tropics."

CATALOGS FOR BRAZIL

WASHINGTON, Sept. 19—United States catalogs of tractors, iron and steel products, automobiles and accessories are desired by the Brazilian Consulate General for the commercial catalog library. This library is available to Brazilian merchants, and if the catalogs are up-to-date and contain price lists, etc., intelligible to the local commercial public, they will greatly facilitate placing orders for American goods.

EXPOSITION AT BUENOS AIRES

NEW YORK, Sept. 16—The dates, April 3 to May 4, 1920, have been set aside by the government of Argentina, according to foreign advices received here, for an exposition of United States manufactures to be held at Buenos Aires. The plan for the exposition is to render the Argentine, Uruguayian and Paraguayian public familiar with American trade marks and goods.

Will End National Highway Committee

National Defense Body Will Be Merged Into Council — Reid At Head

WASHINGTON, Sept. 20—The Highways Transport Committee of the Council of National Defense, organized early in the war to promote the development of highways and general motor truck and automobile traffic, will be disbanded in the near future. Its work will be taken over by the Federal Highway Council, which has been assured of the co-operation of the various Government departments that have heretofore been co-operating with the Highways Transport Committee. These include the War, Navy and Agriculture departments. All worked with the committee for the standardization of traffic rules and the promotion of good roads.

The Highways Transport Committee, at the time of its organization was headed by Roy D. Chapin, president of the Hudson Motor Car Co., who was called to Washington to take this work. He continued until the armistice was signed. The committee was largely responsible for the widespread interest in "return loads" and motor truck freight traffic. It was also one of the important factors in fostering the present keen national interest in good roads, which has resulted in large appropriations by Congress that insure a network of highways across the United States within the next few years.

The work of the committee when it is taken over by the Federal Highway Council will be under the supervision of Chas. W. Reid, who has been at the head of the committee since Chapin resigned. He will be named manager of the Transportation Bureau of the Federal Highway Council.

Montreal Enthusiastic Over Proposed Fall Show

MONTREAL, Sept. 19—It is generally conceded by Montreal automobile enthusiasts that the fall is the logical season to hold an automobile show, especially for closed cars. The question of a closed car exhibition this fall has met with general approval. Judging from several opinions, such an exhibition should and would have unqualified public support and be largely patronized.

While nothing definite has been announced, it is practically assured that there will be a closed car exhibition in this city shortly. Local automobilists are getting together on the matter.

RUBBER CO. MOVES FACTORY

WATERTOWN, WIS., Sept. 20—The Pan-American Rubber Co., 701 Grand Avenue, Milwaukee, manufacturing porous and cellular fillers for pneumatic casings used on light commercial vehicles, has decided to re-locate its works here. The present factory at Cudahy, suburb of Milwaukee, will be moved about Oct. 1 to temporary quarters in the former Wiens Brush Co. plant. A site of four acres has been purchased as a site for a complete new factory to be erected early in the spring of 1920.

Canadian Company Will Build Beaver Trucks

HAMILTON, ONT., Sept. 20—The Beaver Truck Builders, Ltd., is a new concern organized here. Production has been started in a well equipped plant on Adam Street, Hamilton. Plans are already in hand for additions to this plant.

This is an exclusively Canadian company. The president is W. J. Lord; H. R. Williams is vice-president and managing director. Williams was formerly chief engineer of the Smith Motor Corp., Chicago, Ill., and served with the Allied Truck Commission at Washington. The other directors are Ald. J. F. Radigan and A. P. Geering.

F. W. Hogue, formerly sales manager for the Smith Motor Corp. and for Grace Motors, Ltd., Toronto, is director of sales. E. F. Farrell, formerly of the Dominion Power & Transmission Co., is the accountant and office manager, and O. C. Sturdy, formerly of the Smith Motor Corp., is secretary.

The company expects shortly to turn out four trucks a week, but later the number will be increased to one a day.

The Beaver truck, it is stated, will be 80 per cent a Canadian product, practically everything entering into the truck being made in their own plant. At present the company is confining itself to the manufacture of a two-ton truck.

In designing the Beaver truck, Williams has incorporated the leading features of the special military type of truck, as standardized by the Allied Truck Commission. The rear axle is of worm drive, with forced feed oiling system to the worm, allowing unusual road clearance.

ONTARIO REGISTRATIONS AHEAD OF 1918

TORONTO, ONT., Sept. 20—From Jan. 1 to Aug. 31 approximately 120,000 passenger car permits and 9500 motor truck permits have been issued by the Ontario Department of Highways. For the whole of last year there were issued 101,599 permits for passenger cars and 7529 permits for motor trucks.

WINNIPEG FOR ROADS CONGRESS

TORONTO, ONT., Sept. 20—The board of directors of the Canadian Good Roads Association, at a meeting held here recently, decided definitely that the 1920 Good Roads Congress and Exhibition should be held at Winnipeg. Winnipeg was selected as the scene of the convention in 1917.

LINCOLN CAPITAL INCREASED

DETROIT, Sept. 20—The capital stock of the Lincoln Motor Car Co. has been increased from $900,000 to $1,400,000.

Britain Asks for Many Motorcycles

WASHINGTON, Sept. 18—Motorcycles designed for solo or side car work, at a cost of £150 ($730), with specifications described herewith, would sell by the thousands in Great Britain, according to a recent prediction in the London Times, states a Bureau of Commerce report. The specifications should include a four-cylinder "aluminum" engine, preferably water cooled, with overhead valves, completely inclosed transmission, and four-speed gear box and clutch. The description asks an efficiently sprung frame with quick detachable disk wheels, complete electric equipment of dynamo, batteries, lamps and horn, effective mud guards and weather protection so that the rider can wear ordinary clothes, and speedometer and other instruments properly incorporated in the design.

CO-OPERATION IN SHIPPING

CHICAGO, Sept. 17—Members of the Chicago Automobile Trade Association at a special meeting this week were urged by George Bird, a former president, to get together on their express shipments and, by co-operation, to cut their expenses. A forwarding company in Detroit is willing to give express service at freight prices if the Chicago dealers will guarantee a full carload shipment each day.

CONTINENTAL PARTS MOVING

COLUMBUS, IND., Sept. 20—The Continental Auto Parts Co., Knightstown, Ind., has moved to the plant here formerly occupied by the Janney Manufacturing Co., builders of agricultural implements. Six times the present floor space is provided in the new factory and an immediate increase in production is planned. The company builds a line of shop equipment.

TRAILMOBILE FACTORY

CINCINNATI, Sept. 20—Construction of the new Trailmobile Co. factory is progressing rapidly. The first unit will be 200 x 500 ft. The company recently made exhibits of its trailer at the California, Texas and Ohio state fairs and also had a display at the automobile show here this week.

Canadian Province Licenses Ahead of 1918

VICTORIA, B. C., Sept. 20—In the year of 1918 the fees paid for new and renewal licenses at the local office for Victoria and Vancouver Island amounted to $36,400, while by July 31 last more than $6,000 above that sum had been received, the total for the seven months being $42,656.40.

To the end of July, the following was the number of new registrations for seven popular makes throughout the Province: Ford, 991; Chevrolet, 589; McLaughlin, 426; Overland, 284; Studebaker, 112; Dodge, 116; Gray Dort, 94.

Question Validity of Car Transfer

WASHINGTON, Sept. 16—The War Department is charged with having illegally disposed of motor trucks and passenger cars valued at $13,494,600, due to an apparent misunderstanding of recent laws passed by Congress. Early in the war, Congress passed the Post Office appropriation bill which provided for the transfer of motor trucks and passenger cars by the War Department to other Government departments without charge following the termination of hostilities. Later, the Sundry Civil bill passed by Congress contained a clause prohibiting the free transfer of vehicles.

Five thousand two hundred and twenty-five vehicles valued at $11,752,500 were transferred to the Bureau of Public Roads, Department of Agriculture; 868 vehicles valued at $505,600 to the Post Office, and 610 valued at $945,900 to the Bureau of Public Health. As these transfers were said to be in violation of the law the transactions have been called illegal. Numerous other vehicles have been requisitioned but not yet turned over to the departments.

The subcommittee of the House which is investigating War Department expenditures has uncovered these alleged conditions, but has not made any statement as to what action may be taken.

DELEGATES TO TOUR COUNTRY

WASHINGTON, Sept. 19—After the International conference at Atlantic City during the week of Sept. 30, the delegates from Great Britain, France, Italy and Belgium will start on a thirty-day trip, visiting fourteen industrial cities in the United States. A special train will be chartered for the official party.

Places on the itinerary include: Philadelphia, Washington, Pittsburgh, St. Louis, Kansas City, Minneapolis, St. Paul, Chicago, Detroit, Cleveland, Buffalo, Niagara Falls, Boston and New York.

German Trade Information Open to Americans

LONDON, Sept. 5 (*Special Correspondence*)—According to the American Chamber of Commerce here, an American section has been established in the Military Governors' Bureau for Commerce and Information, which has been operating for some time under the auspices of the British Military Governor at Cologne, Germany. The address is No. 41, Am Hof, Cologne. This news will be welcomed, says the Chamber, by American business men going into Germany, as this American section to the Commercial Bureau will be a clearing house of valuable trade information, and an immediate point of contact with the commercial situation in Germany.

The American Chamber in London reported some time ago that the Bureau had been opened by the British Military Governor for British commercial men. French and Belgian sections were added later and now an American section has been established.

The American section is in charge of H. T. Noyes, and the American Chamber of Commerce in London recommends the services of this section to all American business men going into Germany.

For the Truck Operating in Soft Ground

The Fulton Motor Truck Co. has recently placed on the market a wheel attachment, called "ground grippers." These consist of wide iron bands with metal flanges bolted diagonally across the outside of the band and are similar to tractor wheels. They may be attached to the truck wheels in not more than twenty minutes, it is claimed, and enable the machine to go into fields and on muddy roads not otherwise accessible

Plan Award of 1920 Race Championship

Contest Official Proposes Change In Rules—No Prizes Except Through Board

NEW YORK, Sept. 17—A championship award for race drivers in 1920, based upon car performances at a number of speedway and road events, has been proposed by the Contest Board of the American Automobile Association, the governing body in racing matters, and, with other changes, will be brought before the board for action at its next meeting. The most important additional change will be the proposal to prevent the awarding of prizes at sanctioned races other than through the board.

Announcement of these plans were made here to-day by Richard Kennerdell, chairman of the contest board, who will recommend their adoption. Several members have given informal sanction to the changes and Kennerdell predicted that they would govern the various events next year.

The championship award will be similar to that in 1916, when Dario Resta, by obtaining a total of 4100 points in five races, was declared the year's victor. For this he was awarded a cup and $7,500 prize money. The war caused the award to be dropped in 1917 and 1918.

Under the plan, certain races are designated as championship events and each driver receives points for his performance there. These are totalled at the end of the season and the driver with the highest total is awarded the championship, which entails a large financial award. Such an award makes for better racing, Kennerdell believes, as it affords greater interest and makes for wider participation in the numerous events. A large purse, it was stated, probably could be arranged so that from $20,000 to $40,000 might be divided among the winning drivers.

The other change was said to be an attempt to prevent the award of additional prizes by accessory makers. This was allowed during the season just ended and has caused some confusion, Kennerdell said. He hopes next year that all such prize awards will be handled through the board.

HEADLIGHT LAW NEEDS AMENDMENT

TORONTO, ONT., Sept. 20—It is not likely the auto headlight law will be put into force before Jan. 1, 1920. The act says that no rays of light shall rise more than 42 in. above the ground when at a distance of 75 ft. or more from the car. As all light tends to reflect rays, the proposed act will have to be amended so as to exclude the governing of indirect rays.

The Portage Rubber Co., Akron, Ohio, declared 1¾ per cent quarterly dividend on all outstanding preferred stock of record Sept. 20, payable Oct. 1.

FISK SALES $5,000,000 FOR MONTH

CHICOPEE FALLS, MASS., Sept. 20—Sales of the Fisk Rubber Co. amounted to $5,000,000 in August. Its subsidiary, Federal Rubber Co., also chalked up a new sales mark of $1,500,000. Fisk Rubber system, therefore, did a total business last month of $6,500,000. Actual sales of the parent company alone, last year, were $36,000,000.

The operating profits of both companies last month were close to $1,000,000, which charge-offs may reduce to approximately $800,000.

Directors feel that common dividends can now be inaugurated and some time before Jan. 1 a dividend payment will undoubtedly be ordered.

ONEIDA PERSONNEL CHANGES

GREEN BAY, WIS., Sept. 15—The Oneida Motor Truck Co. has made the following changes: C. J. Welch, Kansas City, Mo., has been appointed assistant to the general sales manager; W. C. Calvert, Chicago, is traffic expert and transportation engineer; Edward E. Mauer has been appointed to the Oneida national service department; Edward Ernest Gerlinger, San Francisco, is now Pacific Coast sales manager; M. W. Venable, Atlanta, Ga., is southern sales manager; J. F. Reddick, Akron, Ohio, is in the factory advertising department; W. D. Hawley, has been made assistant to the sales manager, in charge of the central division. J. R. Murphy, W. L. Brown, C. A. Clark, G. L. Thomas and W. H. Carey have been added to the sales department.

PACKARD TRUCK ADDITION

DETROIT, Sept. 16—The Packard Motor Car Co. is erecting a three-story addition to its truck shops. The building and its equipment of machinery when completed, six months hence, will represent an investment of $1,750,000 and an increase of floor space to present facilities. Both an increase in output and a more uniform production will follow completion of this addition. With these expanded facilities the company will be able to turn out three sizes of trucks—its three-ton, five-ton and two-ton, simultaneously.

DOMINION TRACTORS FORMED

TORONTO, ONT., Sept. 20—Dominion Tractors, Ltd., has recently been incorporated by: George Nicholas Hickey and Elwer Edward Theis of Detroit, Ernest S. Wigle, solicitor; William Horne, accountant, and Herbert Ezra Service, of Tilsonburg. The company will manufacture the Hickey farm tractor and will have its head office at Windsor, Ont. The authorized capital is $500,000.

SAMSON MADE IN CANADA

OSHAWA, ONT., Sept. 20—The Samson tractor, which will shortly be put on the Canadian market, will be manufactured at the Windsor factory, which is now in the course of construction and will be assembled at Oshawa. It will be a purely Canadian product.

Current News of Factories

Notes of New Plants—Old Ones Enlarged

COMMONWEALTH CHANGES

CHICAGO, Sept. 18—The Commonwealth Motors Co. will soon have the 1920 Ultra-4-40 ready for delivery. This car does not differ radically from the 1919 model excepting that the rear axle has a spiral bevel drive, the springs are semi-elliptic all around and the rear set is underslung. The tires have been increased from 32 x 3½ to 32 x 4, and the wheelbase has been increased 2 in. to 117 in. The price has been increased from $1,195 to $1,395. There have been other minor refinements made throughout the chassis and body, but otherwise the car is much the same as 1919 model.

BROWN BODY REORGANIZED

CLEVELAND, Sept. 16—The Brown Auto Carriage Co. has been reorganized as the Brown Body Corp., with a capitalization of $1,000,000, for the exclusive manufacture of automobile bodies. A 3½-acre site has been purchased. Work will start immediately upon the first unit of a plant costing approximately $500,000, the units to contain a total floor space of 200,000 sq. ft.

The present organization for the Brown Auto Carriage Co. will remain in control, with P. J. Brown, president; W. G. Schmunk, vice-president, and Carl Halle, treasurer. The Superior Avenue plant of the concern will be converted into a service station on body repairs and wheel work.

AUTOMOTIVE CORP. IN PRODUCTION

TOLEDO, Aug. 23—The Automotive Corp. has purchased a site and will build a factory at once for the manufacture of farm tractors. The company plans to begin work on a building, 90 by 300 ft., shortly. Officers of the company are: President, A. H. Wyatt; vice-president, George G. King; secretary and treasurer, William Hulin.

INTERNATIONAL RUBBER BUILDING

SOUTH BEND, IND., Sept. 23—A building is being constructed for the International India Rubber Corp. for storage purposes. Plans are also nearly completed for a factory building which will increase the capacity from 500 tires a day to a daily capacity of more than 1000 tires and tubes.

TRACTOR PLANT FOR CANADA

GODERICH, ONT., Sept. 20—The Convertible Tractor Corp. of St. Paul, Minn., it is understood, contemplates the erection of a manufacturing plant here.

LEACH BILTWELL WILL MAKE CARS

LOS ANGELES, CAL., Sept. 20—The Leach Biltwell Motor Co. has been incorporated for $1,000,000, absorbing the Leach-Biltwell Co. The concern will manufacture a six-cylinder passenger car called the Leach Power Plus Six. M. A. Leach is president, and other officers are: L. G. Martin, vice president; E. P. Hughes, secretary and treasurer; R. A. Wilson, production manager; R. P. Pennock, superintendent; J. H. Faircloth, purchasing agent; C. N. Graves, eastern factory representative.

Leach established Pacific Coast distributing connections for the Dort Motor Car Co. Later he formed the Leach Motor Car Co., operating as distributer in Los Angeles and San Francisco. For the past year he has been turning out custom made cars. The company will buy its units in the East and assemble them in the plant here. Plans for a new factory will be announced soon.

FORD BUYS DUNBAR

DEARBORN, MICH., Sept. 20—Henry Ford & Son have purchased the factory of the Dunbar Manufacturing Co. at Northville, and will convert it into a plant for the making of tractor parts. Machinery is being removed and concrete bases and floors installed. About 80 men will be employed when the plant is completed. It will be operated by water-power.

BUILDING FOR MOTOR WHEEL

MILWAUKEE, WIS., Sept. 18—The Briggs & Stratton Co., manufacturers of ignition specialties and automotive equipment, are breaking ground for a five-story manufacturing addition, L-shaped, 62 x 172 and 62 x 155 ft., at Teutonia Avenue and Center Street, which will increase the capacity more than 100 per cent within 90 days.

The addition will be used largely for the manufacture of the Briggs-Stratton motor-wheel, formerly the Smith, which the Briggs & Stratton Co. recently purchased from the A. O. Smith Corp. They now control the patents, designs, equipment and exclusive rights to manufacture the motor-wheel, which is a power device for bicycles and is also built in the form of a miniature car of the buckboard type.

G. M. C. Gets Metal Company

CLEVELAND, Sept. 20—The plant of the Buffalo Metal Goods Co., Buffalo, N. Y., maker of coaster brakes, which has been taken over by the General Motors Co., is to be operated under the New Departure Mfg. Co., Bristol, Conn., one of the G. M. C. subsidiaries. There will be no change in the Bristol company

SALE OF WILLYS STOCK

NEW YORK, Sept. 19—The $15,000,000 stock of the Willys Corp. is being offered at $100 a share, par value. It is 8 per cent, cumulative convertible sinking fund preferred stock, redeemable in whole or in part at 110 and accrued dividends on thirty days notice.

Osterloh to Manage California Goodyear

AKRON, OHIO, Sept. 16—The Goodyear Tire & Rubber Co. has appointed A. F. Osterloh, secretary of the company, vice-president and general manager of the Goodyear Tire & Rubber Co. of California.

The California company has a capitalization of $20,000,000, will employ 7000 workers at the start and will have a capacity of 7500 tires per day. Its cotton mills will be operated by a subsidiary company, the Pacific Cotton Mills Co., with 32,000 spindles and a capacity of 75,000 lb. of cord fabric and 75,000 lb. of woven fabric each week, with 1200 employees.

The ultimate plans of the Goodyear company contemplate for the California plants an expansion of both industries to four times the original capacity.

Frank Kane, for three years with the advertising department of the Packard Motor Car Co., has joined the staff of Erwin & Wasey, advertising agents, Chicago.

Jay V. Hall, formerly general sales manager of the Olds Motor Works, who resigned that position some time ago, is now with the new Willys Corp. and is located at the Duesenberg plant where he is in charge.

V. L. Curran has resigned as purchasing agent of the Sparks-Withington Co., Jackson, Mich., and has acquired an interest in the Jackson Screw Products Co. He assumed the duties of general manager Sept. 15. Curran is succeeded by James T. Beadle, for many years a buyer for several Jackson automobile manufacturers.

Floyd Smith has been appointed manager of purchases of the Pierce-Arrow Motor Car Co., Cleveland, and Otto Utz, assistant manager. Smith was formerly assistant purchasing agent of the Maxwell Motor Co. and later director of purchases of the Wright-Martin Aircraft Corp.

W. Carl Parker has been appointed to the managership of the Lansing branch of the Reo Motor Car Co., Lansing, Mich., to succeed Clarence Triphagen, who recently assumed the position of manager of the newly-established Reo Detroit branch.

Walter K. Towers, who until a short time ago served with the A. E. F. as publicity director for Europe for the United War Work campaign and later with the Motor Transport Corp., has succeeded W. Carl Parker at the Reo Motor Car Co., Lansing, Mich.

W. W. Wildman has resigned as treasurer and general manager of the Portage Rubber Co., Barberton, Ohio. His future plans have not been announced. He has been connected with the Portage company for the past eight years, having come to Akron to take charge of the Aladdin Rubber Co., which later merged with the Portage company. His successor has not been named.

Men of the Industry

Changes in Personnel and Position

DEATH OF GOODYEAR PRESIDENT

EAST ORANGE, N. J., Sept. 20—F. M. Shepard, president of the Goodyear Tire & Rubber Co., Akron, died at his home here on Sept. 18 at the age of 61.

Russell Munroe has resigned as assistant advertising manager of the Ford Motor Co. to become assistant sales manager of the newly organized Ford Motor Co. branch in Paris, France. Munroe has been with the Ford organization for several years. He recently returned from France, where he served with the French army and later with the American Red Cross.

Alwin A. Gloetzner, formerly vice-president in charge of sales and engineering of the Covert Gear Co., Inc., Lockport, N. Y., has been appointed president and general manager of the company, succeeding P. A. Clum. He will spend four days each week at the Lockport plant and the balance of his time in Detroit.

Dr. George C. Barlow has resigned as president of the U. S. Tractor Co., Menasha, Wis., because of ill health, and is succeeded by Joseph G. Sailor, whose place as vice-president is filled by E. M. McGillan, mayor of Menasha. The company was organized early this year to take over the business of a company of similar name at Chicago. A new plant has been erected and equipped and has been manufacturing the Uncle Sam tractor in quantities since June.

Theodore T. Lane, until recently a lieutenant in the United States Air Service, has been appointed director of purchases for Briscoe & Stahl, Detroit, American representative of Bollanger Freres. His previous experience in automotive lines includes connections with the Maxwell-Briscoe Co., Tarrytown, N. Y., the United States Motor Co., New York; Maxwell-Briscoe Co., Newcastle, Ind., and the Briscoe Motor Co., Jackson, Mich. He has also been connected with Dodge Bros., Detroit.

Arthur J. Slade, consulting engineer on motor transportation, has resumed his practice at 1790 Broadway, after serving two years in the army as Lieutenant-Colonel, organizing and directing the engineering division of the Motor Transport Corps.

Joseph E. Otis, vice-president of the Central Trust Co. of Illinois, has been elected a director of the Stewart-Warner Speedometer Corp., Chicago.

J. Fletcher Farrell was elected a director of the Briscoe Motor Corp., Jackson, Mich., at a meeting of the board of directors.

STERLING OFFICIALS SAIL

MILWAUKEE, WIS., Sept. 22—E. N. Sternberg, vice-president, and Carl G. Hayssen, assistant general manager of the Sterling Motor Truck Co., sailed Sept. 16 for Europe to spend three to four months in surveying the truck industry in England, France, Belgium, Italy, Denmark, Norway, Sweden and other continental countries. The trip may be extended to include India and Australia.

FOOTE-BURT REORGANIZED

CLEVELAND, Sept. 19—The Foote-Burt Co. has reorganized. A. W. Foote, president and treasurer, and G. S. Burt, secretary, have retired. The Burt estate, representing the preferred stock interest, has been retired. G. E. Randles, formerly vice-president, becomes president. Other officers are: Vice-president, T. H. Doan, Jr.; secretary, W. S. Quinlan, and treasurer, S. E. Gross. J. R. Blakeslee and S. L. McCune, with the officers, form the board of directors.

RESILIENT TIRE CO.

MILWAUKEE, WIS., Sept. 22—The Resilient Auto Tire Co. is a new corporation organized with $100,000 capital by Charles Uhrincz, Joseph Hornyak and Edward A. Mahal to manufacture tires and rubber goods.

Harry J. Lindsley, who has been western sales manager for the past seven years for the Bound Brook Oil-less Bearing Co., Bound Brook, N. J., and William F. Jennings, eastern sales manager for the company for the past five years, have been made vice-presidents of the concern.

A. L. Tisch, advertising manager of the Paige-Detroit Motor Car Co., Detroit, for six years, has resigned. He is going into the retail business, and has made connections with the Robb Motor Car Co., Chicago, in an executive capacity.

Victor Greiff, a lieutenant in the Bureau of Steam Engineering, Naval Reserve Force, has been appointed research engineer for the American Bosch Magneto Corp., Springfield, Mass. His previous connections have been with the Covic Electrical Co., the New York Edison Co. and the General Electric Co.

S. S. Newton, president of the Luther Grinder Mfg. Co., Milwaukee, has resigned and will retire because of advanced age. W. T. Hardy has been elected a director and president of the corporation. The business was founded twenty-one years ago. Mr. Newton is 68 years old and was active in the management for eighteen years.

Hi Sibley, for two years a member of the Packard Motor Car Co.'s advertising staff, has resigned and will make his home in California.

TREASURER'S WIFE DIES

SOUTH BEND, IND., Sept. 20—Mrs. Joseph D. Oliver, Jr., wife of the treasurer of the Oliver Chilled Plow Works, died last week in Philadelphia as the result of injuries received when she was thrown from her horse last December.

Calendar

SHOWS

Sept. 24-Oct. 4—New York, N.Y. New York Electrical Show, Grand Central Palace.
Sept. 24—Charlotte, N. C. Carolina's Automotive Trade Assn.
Sept. 30-Oct. 14—Dallas, Texas. Southwest Motor Show, Dallas Automobile and Accessory Dealers' Assn.
October—Ft. Dodge, Ia. Fall Motor Show, District Fair Grounds.
Oct. 6-11—Detroit, Mich. Closed Car Show, Arena Gardens, Detroit Auto Dealers' Assn., H. H. Shuart, Mgr.
Oct. 11-18—Pittsburgh, Pa. Fall Show.
Oct. 15—New York City. Opening of International Farm Tractor and Implement Exchange, Grand Central Palace.
Nov. 3-8—Chicago, Ill. Business Exhibit of Automotive Equipment Assn., Medinah Temple.
Nov. 16-23—New York Automobile Salon, Hotel Commodore.
January—New York. International Automobile Mfrs. Congress.
Jan. 3-10—New York, N. Y. Grand Central Palace, National Automobile Chamber of Commerce, S. A. Miles, Manager.
Jan. 3-10—New York City. Eighth Coast Artillery Armory, commercial cars and accessories.
Jan. 24-31—Chicago, Ill. Coliseum, Cars; Drexel Pavilion, Trucks; National Automobile Chamber of Commerce. S. A. Miles, Manager.
Jan. 24-31—Chicago. International Amphitheater, commercial cars and accessories.
Feb. 23-28—Louisville, Ky. Twelfth annual exhibition. Louisville Automobile Dealers' Assn, First Regiment Armory.
February—Chicago. International Automobile Mfrs. Congress.
February—Deadwood, S. D. Annual show, Deadwood Business Club, F. R. Baldwin, Manager.

FOREIGN SHOWS

Aug. 23-Oct. 6—Toronto, Can. Cars, Trucks and Tractors, Airplanes and Motor Boats in conjunction with Canadian National Exhibition.
Sept. 24-27—London, Eng. Commercial Vehicles Exhibition, Olympia Society of Motor Mfrs. & Traders, Ltd.
Sept. 24-27—Lincoln, Eng. Tractor trial. Society of Motor Manufacturers and Traders, Ltd.
Sept. 24-27—Lincoln, Eng. Exhibition of tractors and agricultural vehicles, in connection with the tractor trials.
*Oct. 9-19—Paris. Grand Palais, International Automobile Mfrs. Congress.
Oct. 14-16—Ottawa, Ont., Can. Interprovincial Plowing Match and Tractor Demonstration.
November—Christchurch, N. Z. First National Motor.
Nov. 7-16 — London. Olympia Motor Car Exhibition—Society of Motor Mfrs. and Trades.
December — Brussels. International Automobile Mfrs. Congress.
January — Glasgow, Scotland. Scottish Motor Exhibition.
February — Manchester, Eng. North of England Motor Exhibition.
Feb. 23-March 6—Birmingham, Eng. British Industries Fair.
March—London, Eng. Motor Boat, Marine and Stationary Engine Exhibition.
March—Adelaide, Australia. All Australian Exhibition of motor vehicles, airplanes, engines and automotive equipment.
April or May—London, Eng. Commercial Vehicles Exhibition, Olympia.
April 3-May 4—Buenos Aires. Exposition of U. S. manufactures.

AUTOMOTIVE SHOWS AT FAIRS

Sept. 20-27 — Oklahoma City, Okla. Cars, trucks and tractors. J. S. Malone General Manager.
Sept. 20-27—Memphis, Tenn. Cars, trucks and tractors.
Sept. 21-27—Salem, Ore. Car and truck show. Dealers' Motor Car Assn. of Oregon, Oregon State Fair.
Sept. 22-27—Allentown, Pa. Lehigh County Agricultural Assn.
Sept. 22-27—Pueblo, Colo. Cars, trucks and tractors. J. L. Beaman, Manager.
Sept. 22-27—Salem, Ore. Cars, trucks and tractors. Dealers' Motor Car Assn., M. O. Wilkins, Manager.
Sept. 24-Oct. 4—Kansas City, Kan. Cars, trucks and tractors.
Sept. 27-Oct. 4—Fort Dodge, Ia. First annual fair of Hawkeye Fair Assn.
Sept. 29-Oct. 4—Meridian, Miss. Cars and tractors. A. H. George, General Manager.
Sept. 29-Oct. 4 — Chattanooga, Tenn. Chattanooga Auto Dealers' Assn.
Sept. 29-Oct. 4—Muskogee, Okla. Cars, trucks and tractors.
Sept. 30-Oct. 3—Brockton, Mass. Cars.
Sept. 30-Oct. 4—Lancaster, Pa. Lancaster Fair Assn.
October—Columbia, S. C. Columbia Automobile Dealers' Assn.
Oct. 6-19—Dallas, Tex. Cars, Trucks and Tractors, Texas State Fair.
Oct. 20-25—Raleigh, N. C. Cars, trucks and tractors.
Oct. 22-27—Shreveport, La. Cars, trucks and tractors.
Oct. 27-31 — Columbia, S. C. South Carolina State Fair Assn.
Nov. 3-8—Phoenix, Ariz. Tractor Demonstration, Arizona State Fair.

TRACTOR SHOWS

Sept. 22-28—Waterloo, Ia. Automobile show, in connection with Waterloo Dairy Cattle Congress; Black Hawk County Motor Trades Bureau, G. V. Orr, Secretary.
Sept. 23-26—Centreville, Mich. St. Joseph County Farm Bureau, Prof. H. H. Musselman, professor of Farm Mechanics at Michigan Agricultural College, manager.
Sept. 30-Oct. 2—Houston, Tex. Tractor Demonstration, Houston Chamber of Commerce, A. E. Hildebrand, Mgr.
Oct. 14-17 — Evansville, Ind. Central States Tractor Sales Show, W. R. Heilman, Mgr.
Oct. 15 — Ellensburg, Wash. Tractor demonstration in charge of W. L. Davis, County Agricultural Agent.
Oct. 15-18—Charleston, W. Va. Tractor Demonstration, Kanawha County Fair.
Oct. 30—Yerington, Nev. Tractor demonstration, Lyon County Farm Bureau.
Nov. 22-29—Jacksonville, Fla. Florida State Fair and Exposition. B. K. Hanafourde, Manager.
February — Kansas City, Mo. Fifth Annual Kansas City Tractor Club, Guy H. Hall, Manager.
Feb. 9-14—Wichita, Kan. Tractor and Farm Machinery, Forum, Wichita Thresher-Tractor Club.

CONTESTS

Sept. 27—Allentown, Pa. Dirt track event.
Oct. 1.—St. Louis, Mo. National Balloon Race, International Aeronautical Federation. Sanctioned by Aero Club of America.
Oct. 4 — Trenton, N. J. Dirt track event.
Oct. 11—Cincinnati, O. 300 mile Speedway race.
Oct. 11—Danbury, Conn. Dirt track event.
Nov. 2-3—El Paso, Texas. El Paso-Phoenix road race.
*Nov. 27—Los Angeles, Cal. Ascot Speedway race.
Dec. 29—Los Angeles, Cal. Ascot speedway race.
August, 1920 — Paris, France, Grand Prix Race, Sporting Commission, Automobile Club of France.

CONVENTIONS

Sept. 21-25—New Orleans. Fifteenth Annual Convention of Associated Advertising Clubs of the World.
Sept. 22-27—Chicago. Annual Convention of Carriage Builders' National Assn., Hotel LaSalle.
Sept. 24-25—Sheffield, Eng. Institute of Metals.
Sept. 26—Detroit. Detroit section S. A. E., Hotel Pontchartrain.
Sept. 30—Philadelphia. Motor and Accessory Manufacturers' Assn., Manufacturers' Club.
Sept. 30-Oct. 3—Atlantic City, N. J. Convention of business men called by Chamber of Commerce of U. S. to confer with foreign delegates.
Oct. 1—Denver, Colo. Directors' Meeting, National Automobile Dealers' Assn.
Oct. 1-4—Cleveland. Eighth annual safety congress of National Safety Council.
Oct. 9-10 — Jackson, Miss. Second Annual Convention, Louisiana-Mississippi Assn.
Oct. 14-17—Atlantic City, N. J. Twenty-fifth Annual Convention, Marlborough-Blenheim, National Hardware Association of the United States.
Oct. 15-17—Chicago. Twenty-sixth annual convention of the National Implement and Vehicle Assn., Congress Hotel.
Oct. 29—Washington, D. C. Annual Labor Conference provided by Peace Treaty.
November—London, Eng. Road Transport Congress and Exhibition.
Nov. 3-8—Chicago, Ill. Convention, Automotive Equipment Assn., Medinah Temple.
Nov. 7-8—Detroit. Meeting of National Assn. of Motor Truck Sales Managers, Hotel Statler.
Dec. 3-5—Cleveland. Ohio Automobile Trade Assn., Annual Convention.
January, 1920 — Washington. Pan-American conference.
Feb. 9-13—Louisville, Ky. Seventeenth Annual Convention American Road Builders' Assn., Tenth American Good Roads Congress and Eleventh National Good Roads Show.
May 15-20, 1920—San Francisco. Seventh National Foreign Trade Convention.

FORM NEW BODY COMPANY

DOVER, DEL., Sept. 23—The Lang Body Co., with a capitalization of $3,000,000, has been formed here for the manufacture and sale of automobile and airplane bodies. The incorporators are Joseph S. McDaniel and M. E. Scanlon, of Dover.

NEW PISTON MAKER

LOS ANGELES, Sept. 20—The Clark-Turner Piston Co., with offices at 1246-1248 South Los Angeles Street, has been organized to manufacture the De Luxe lightweight gray iron piston. These pistons are reinforced by a system of webbing both in the head and down the skirt and are considerably less in weight than pistons of standard make.

ADDS PASSENGER BODIES

COLUMBUS, O., Sept. 20.—The Columbus Commercial Body Co., which operates a factory at 640 Jefferson Avenue, is adding considerable equipment and metal working machinery for the manufacture of passenger bodies. Heretofore the company has confined its output to the manufacture of commercial bodies. It will continue to make commercial bodies, but will concentrate on passenger bodies.

BATES AGRICULTURAL TRACTOR

LANSING, MICH., Sept. 20—The Bates Tractor Co. is about to bring out a new model tractor, especially adapted to agriculture. It abandoned tractor work during the war but now proposes to get back to tractor production.

GILSON ADDING BUILDING

PORT WASHINGTON, WIS., Sept. 22—The Gilson Mfg. Co., maker of gasoline engines, small tractors, and doing a general gray-iron foundry and machine-shop business, has broken ground for a one-story brick and steel shop addition, 60 x 160 ft.